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THE Congress of French architects for the year 1885 is to be held at Paris in June, beginning on the eighth, and closing on the seventeenth. The programme for the meetings has already been sent out, and indicates that several questions of great interest to the profession will be discussed, and perhaps decided, so far as France is concerned, by the action of so influential an organization. In order to give to the consideration of the subjects proposed as much time and thought as possible, a plan has been adopted for the present year which seems worthy of imitation in the deliberations of other bodies of the kind. Instead of assigning certain days for the general discussion of these, among other items of business, to be either hastily decided, or laid on the table, the programme provides that the first business of the first day of the Congress shall be the nomination of committees, each charged with the study, during the week of the sittings of the Congress, of one of the special subjects assigned for consideration. Five days are allowed the committees for deliberation and study, the other members of the Congress occupying themselves meanwhile with other business. At the end of the five days each committee is required to present a report, with such recommendation as to the action of the Congress as it may see fit to propose; and these reports and recommendations will be taken up in order, and adopted or rejected, as the vote of the Congress may turn. This method of treating important general questions, which is really only an adaptation of that employed by legislative bodies, has the advantage of preventing the hasty decisions which so often destroy the value of the deliberations of bodies which meet infrequently and lack experienced leadership. Most of our readers have probably belonged to such bodies, and know how often the members, in the confused state of mind resulting from a tiresome discussion, will pass resolutions which they never really understood or intended, and which, if important enough, have to be subsequently rescinded. These slips do no great harm in church or society meetings, but when they occur in the deliberations of the representative body of a great profession they do more than one might think to discredit and injure the whole profession, and all reasonable precautions against ill-considered action should, on such occasions, be adopted.

THE particular matters which the Congress of French Architects is to discuss this year are nine or ten in number. One of these, the Association for Mutual Defence, is reserved for the consideration of the whole body in the first instance; the others, including questions of public competitions, schedules of charges, public and private sanitation, the property of artists in their works, and the responsibility of architects, are to be studied by committees before they are presented to the Congress, to prevent hasty or meaningless action. The exception in favor of the subject of the Mutual Defence Association is probably made partly on account of the thoroughness with which the plan of the Association has already been discussed, and partly for the sake of interesting as many individual members as possible in the plan. At last accounts, about one hundred and sixty architects had already signed the articles of the Association, and, as it is confidently expected that enough more will join on the occasion of the Congress to complete the full number of three hundred, there seems to be good reason for making the discussion upon its affairs as open and public as possible. As in other countries, the French architectural congress will be enlivened by excursions, the longest of which will be to Rouen, and by visits to various new and old buildings.

SOME experiments, according to the *Builder*, have recently been made in Munich, by Professor Bauschinger, to determine the comparative security of exposed cast and wrought iron columns in case of fire. It is well known to most architects that cast-iron columns are liable to warp and crack when subjected to the heat of a conflagration, particularly if cold water is thrown upon them while they are hot, and precautions against this are now very commonly employed where iron columns are used in building. In New York the law requires that all cast-iron columns which sustain walls shall have an independent exterior casing, to protect them both from the heat of a fire and from water, and a similar regulation, extended to all cast-iron columns used in building, has lately been adopted in Berlin. Columns of wrought-iron, however, which are of course much less brittle than those of cast-iron, are allowed to be used there without protection, and Professor Bauschinger's tests seem to have been made primarily with the intention of obtaining information as to the behavior, under the conditions which exist in a building on fire, of these columns, which, though often used by engineers for supports of bridges, are seldom employed in strictly architectural work. For the purpose of experiment, unprotected columns, both of cast and wrought iron, were loaded with the average weights which they are expected to sustain in actual buildings, and were then heated, first to a temperature of three hundred degrees, then to six hundred, and finally to a red heat, and were then suddenly cooled by a jet of water from a hose. Under these circumstances the cast-iron columns warped and cracked, as was expected, but did not yield entirely, while the wrought columns began to bend before they were heated to redness, and were so violently distorted when cold water was thrown upon them that they could no longer support their load. No doubt the form of the wrought-iron column would determine to some extent its liability to bend when heated, but it is worth remembering that at least in this case they have proved inferior to those of cast-iron, and seem to require protection against fire quite as much as the cheaper kind. The simplest protection, as we may again remind our younger readers, both for cast and wrought columns, consists of a coat of plaster, put on wire-cloth wrapped around the column. If the wire-cloth is held out a little from the iron by wooden furrings, or by corrugations in the cloth, so as to give the plaster a good key everywhere, a perfect and permanent protection is secured at very small expense, and we should not be sorry to have the law require such protection for all columns used in building.

THE *Builder* also quotes from a paper read by Mr. Rymer-Jones before the English Civil and Mechanical Engineers' Society a number of recipes for protecting wood against fire, which deserve to be remembered. Besides the old processes of Burnettizing and Kyanizing, by which the wood is saturated with mineral substances, various superficial applications are made, of greater or less effectiveness. In many of these silicate of soda enters as an ingredient, and a wash of the silicate of soda alone, dissolved in water, is very efficacious in protecting wood against flame. We should be inclined to qualify this by saying that the protection afforded by silicate of soda was apt to be reduced in time by the gradual efflorescing and falling away of the varnish-like coating which it gives; but for temporary purposes it is excellent. Asbestos paint is said by the author of the paper to be nearly as valuable as the silicate solution, and probably clings much longer to the wood. A cheaper application, which seems to depend for its effect on the formation of a coarse silicate of potash and lime in it, is made by grinding together one part of fine sand, two of wood ashes, and three of slaked lime, with oil enough to form a paint, which is laid on with a brush, and adheres well, besides being both fire and water proof. Still another wash, which is coming into extensive use in our own country for shingled roofs, is composed of lime, salt, and fine sand or wood ashes, mixed

with water to the consistency of whitewash. It may be colored with lamp-black or ochre, to take off the glaring whiteness, and forms a very efficient protection against danger from sparks or cinders.

IRON gives a very interesting account of the life of the late Sydney Gilchrist Thomas, the joint inventor, with his cousin, Percy Gilchrist, of the renowned Thomas-Gilchrist process for making cast-iron contaminated with phosphorus into good Bessemer steel by means of a basic lining to the converter. The whole story offers a remarkable example of the literal realization of a boy's dream, as well as of the disappointment which usually accompanies the realization of dreams of material prosperity. Sydney Thomas was born in 1850, and had therefore barely reached his prime at his death last February. He was educated at Dulwich College, intending to study medicine, but the death of his father obliged him, at the age of seventeen, to find a situation in the civil service, in which he wrote and copied all day, and spent his evenings in attending courses of lectures on chemistry and metallurgy, which had a great attraction for him; as well as in acquiring a knowledge of law, which he thought to be necessary to the faithful performance of his official duties. He could not study the metallurgy of iron long without discovering that the greatest obstacle in the way of the success of the Bessemer process lay in the impossibility, with the ordinary appliances, of utilizing for that process the phosphuretted iron obtained from the cheapest and most abundant English ores. Years before, the books on iron manufacture had spoken warmly of the fortune in store for whoever should discover a way of making good wrought-iron and steel from the Cleveland and other similar ores; and the poor young Government clerk made up his mind that he would get that fortune. So completely did this idea take possession of his thoughts that it appeared continually in his conversation, and he often amused himself by calculating how much income a royalty of half a shilling a ton on the three millions of tons of iron produced annually in the Cleveland district would bring him in. As a poor boy in an office, his means for attaining his end were about as limited as they could well be, but he had his evenings for study, and the energy and capacity for improving them, and it was not long before his efforts began to have some result. His cousin, Percy Gilchrist, was chemist in an iron furnace in Wales, and Thomas, after learning everything that he could about what had already been done in the way of de-phosphorizing Cleveland iron, laid out a systematic course of experiments, which he begged his cousin to carry into execution for him. This was done, at a small scale, and the results carefully noted, Thomas himself assisting in the experiments whenever he could get a few days' vacation. Years passed in these trials, but step by step the two friends improved their methods, and in 1877, when Thomas was in his twenty-seventh year, a patent was granted to him for a process for dephosphorizing iron.

UP to this time all the experiments of the cousins had been made on a small scale, but they now felt sure of their ground, and obtained permission to apply their process to a thousand pounds of iron in a Bessemer converter, and later, to five tons at once. More patents were taken out, for improvements in the original process, but their publication fell quite dead upon the scientific world. In 1878, nearly a year after the granting of the first patent, Thomas sat at a meeting of the Iron and Steel Institute, listening to a paper read by a celebrated metallurgist on a process for eliminating phosphorus from iron by melting in a furnace lined with oxide of iron. At the conclusion of the reading, Thomas took part in the discussion of the paper, and mentioned that by his process, applied to quantities of iron varying from six to a thousand pounds, he had succeeded in removing all, or nearly all, the phosphorus from Cleveland iron, as shown by analysis, and fitting it for conversion into Bessemer steel. He was listened to with polite incredulity, and in the summing up of the discussion his remarks were completely ignored; and later, when he offered to read an account of his process before a meeting of the Institute, his paper was put at the very end of the list, and the reading of it was finally postponed altogether. It had, however, been printed, and distributed to members, and produced a great sensation among practical metallurgists in Europe and America; and preparations were made for testing the process on a grand scale. From that time fame and fortune began to flow in upon the cousins; two or three claims of priority made by earlier, but unsuccessful experimenters were honorably adjusted, and immense steel works, managed under the new system, were established on the Continent, as well as in England. Almost at that moment, however, Thomas's health failed. His exertions, and the exposure incident to his frequent journeys, had brought on an affection of the lungs, and his physicians ordered him to a warmer climate. Accompanied by his mother and sister, and a younger brother, he spent successive winters in Australia, India, Algiers and America, and finally went to Paris for treatment. The treatment proved unsuccessful; he grew worse, and his brain gave way, and he died there, completing the sacrifice of life, health and home, in exchange for which he had received the great prize of his youthful ambition.

MR. KEELY, the great inventor, has at last, according to the Philadelphia *Record*, "attained the object of his life." This object was not, it seems, to live comfortably at the expense of the credulous, but "to discover the power which for years he had sought;" and although we supposed that this power had for years been grinding Mr. Keely's coffee for him, and shooting off his little air-guns, on the most familiar terms, we are glad, if he had not done so before, that he has at last secured a good view of the sprite which has so long been working for him. The task seems to have been indeed a difficult one, and we trust that those unbelieving stockholders in Mr. Keely's company who said that the great man spent his time in driving a fast horse which was bought with their money will hang their heads with shame when they hear that he has labored, locked in his workshop, from fourteen to eighteen hours a day, for the past six months, in constructing "a new engine," which is operated on a system entirely different from anything ever used before. One feature of this new system of operation, which will probably appear more important later, is that the original Keely Motor Company will have no part in it, and a new company, with a brand-new capital, and a fresh set of gudgeons for stockholders, is to be formed to carry it into effect. When these preliminaries have been satisfactorily arranged, the "rotary etheric engine," as the new machine is to be called, will "go forth to the world." The power employed in the rotary etheric engine is to be derived, as in the previous machines, from "the interatomic air, or rather luminiferous ether." Considering the luminiferous character of Mr. Keely's agent, there has always been a surprising obscurity about its manifestations, but we are informed that "it is greater in volume by five or six times than gunpowder," and that in a recent experiment a pressure of "twenty-two thousand eight hundred pounds to the square inch" was obtained "in eight seconds." Like the air-gun exhibited at Sandy Hook, the "rotary etheric engine" is to be furnished with "an introductory receptacle," and has also a "liberator," the purpose of which is not apparent. If everything goes well, an exhibition of the new machine is to take place in a few weeks, when an engine "equal to five hundred horse-power" is to be shown. What the stockholders of the old company are to get for their money, beyond an interest in some lumps of old iron, we are not informed, but it is suggested that an arrangement may be made for exchanging the old shares, at a small valuation, for stock in the new corporation.

THE passion for huge cantilever bridges seems to be spreading, and one is now proposed, for crossing the St. Lawrence River at Quebec, which, if it is ever built, will almost rival the Forth bridge itself in dimensions. The widest span of the Forth bridge is, if we recollect rightly, to be seventeen hundred and ten feet, but there is to be a second span only ten feet less in width, while the Quebec bridge will have only one wide span, of about fifteen hundred and forty feet, and two short shore ends. In profile, the Quebec bridge is to be very similar to its Scottish type, although the trussing is somewhat simpler, but the horizontal wind-bracing, which in the Forth bridge is secured by considerable lateral extension of the construction, is managed at Quebec by placing the two great systems of parallel trusses about seventy feet apart, and carrying the two tracks of the railway which crosses the bridge directly through the trusses, penetrating the network of uprights and cross braces as a knitting needle threads its way through the loops of a stocking. The lower chords of the trusses serving thus to carry the roadways, nothing is needed between them but the rods or eye-bars of the lateral bracing, which can be applied with great effectiveness and economy under such circumstances.

PERUGIA.

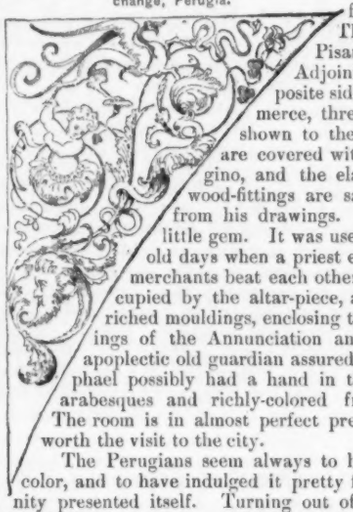
San Pietro, Perugia.

IN journeying about Italy one is constantly brought face to face with the past. Hardly anything the modern state has accomplished is ever considered as worthy of more than passing attention, but the student or tourist is continually called upon to admire what was produced by men who lived and worked centuries ago; and, especially in central Italy, one is apt to become exceedingly tired of looking backward and straining to bring one's self into sympathy with what is away and removed from our nineteenth-century wants and expectations. The boast of the modern Italian is in what his forefathers did. For himself he is content to remain placidly in the halo of what he fondly calls his own art, while Anglo-Saxons and Gauls overrun the land and gorge themselves to indigestion with old masters, and look upon Italy merely as a great art-school, kindly preserved for their especial benefit and taken care of by the art-less modern Italians. And after a long stay in Rome, where one is sure to contract a stiff neck, from trying to compass in his vision all the dead Roman, early Christian and Renaissance art, or a visit to a few sleepy-eyed, provincial towns like Viterbo, it is quite refreshing to find in Perugia an old city which one can easily appreciate: a place where the antiquity seems to reach down to 1885, so that no mental straining is required to glance back along the line to old master Pietro Perugino, the father of so much greatness, or even farther back, into the days of the Etruscans and the rock-cut tombs. Elsewhere there is nearly always a questioning gap at some point in the art-history; a falling empire or an invading barbarian horde having upset everything, and mixed styles and dates in such hopeless confusion, we never venture to explore too closely. But in this old Umbrian capital the ages and the invaders have dealt kindly with all the arts, and the city can fairly be said to present its mediævalism to the modern architectural student under very much the same aspect it appeared to Benedetto Bonfigli, four centuries ago, when he drew those pictures in the Pinacoteca which show some portions of the town so very much resembling the modern Perugia that one is almost tempted to believe some skilful patcher has been at work on the old frescoes, and compelled antiquity and the nineteenth century to agree.

For some occult reason which is often questioned but never fairly expounded, Italian railways always carefully avoid the city at which they may be aiming. Consequently, after a ride across the rich Umbrian plain, and a cut through the mound where the old Etruscan dead are still assumed to be reposing, the traveller finds himself not at Perugia, but at the base of a high hill, on top of which lies the city, full three miles distant by the road, spreading over the irregular summit, extending to the right across a long spur, and reaching part way down into the valley. It is a stronghold, a city set on a hill, and though the traveller may be disposed to grumble at the railroad which would not climb the height for him, after he has reached the top and stands on the terrace, full thirteen hundred feet above the winding Tiber, he will forget everything but the glory of the magnificent prospect before him: the great broad valley dotted with villages and rising grandly on either side to the hills, now capped by an early April snow; Assisi, perched saddlewise on the spur of a near mountain at the left; Foligno, towards the end of the long, fine line which marks the railroad; and perhaps even a glitter from one of the towers of Spoleto. And then, if our traveller is an architect, he will turn and walk down the length of the Corso — the only level street in the place, and short at that — and take his stand on the steps of the gaunt, naked cathedral, face to face with the Palazzo Publico. A fine structure it is, this old town-hall, with its high, irregular balcony on the front, where proclamations were wont to be made and criminals' heads exposed to scorn, and its boldly-designed side portal, rich with twisted shafts, sharply-cut leaf-work, and emphatic mouldings, above which, on each side, a lion springs savagely from an abrupt corbel. There are not many details about the building; a few good windows, an effective cornice, and a little delicate work set against the rude stonework at the lower belt-course; but everything counts and helps out the dignified effect of the whole in a manner which a photograph only partly expresses; an effect which is greatly enhanced by the rich, dark color of the old masonry — *bona fide* stone-work, too; not the stucco which makes so many Italian buildings take well in a photograph. The palace was erected towards the close of the thirteenth century, a period when Perugia was a proud city and strong enough to hold her own against the restless Tuscan republics which at that time were so continually wrangling with each other and all their neighbors. Over the principal entrance are figures of a griffin and a wolf, representing respectively Perugia and Siena, while the vanquished expression of the latter animal, and the heavy chains and gate-bolts suspended at another door, are the tokens of the victory won over Siena in 1358. The palace is one of the comparatively few good examples of civic Gothic architecture existing in central Italy, and is worthy of most thoughtful study.

In the upper story of the palace is a long, rambling picture-gallery, stored with paintings gathered chiefly from the suppressed monasteries and convents of the surrounding country. A few days ago I met an architect who declared he did not care a straw for paintings, and deliberately proposed to skip all the old masters. Perhaps he was right. Such a course saves considerable bother and spares one any doubt or conjecture about this Pinturicchio or that Le Spagna. But, somehow, if the chief end of a visit to Italy be really to gain a keener and more sensitive art-taste, the old pre-Raphaelites cannot be wholly ignored. And though contemplating the quiet sweetness of some of the Fra Angelicos such as are in this gallery may not help one a whit toward preparing specifications for a $1,500-stable, or making details of a front staircase, it will surely lead the way to a truer appreciation of some of the delicate architectural results achieved by the old master-builders, whose inspirations were perhaps as pure, if in a different line, as those of da Fiesole. The gallery contains an interesting succession illustrating the whole history of Umbrian painting, including several of Perugino's best works, and a few even ascribed to Raphael.

Immediately in front of the Palazzo is the Fonte Maggiore, one of the finest fountains of its kind in Italy, a great polygonal basin set up on a few steps, with an inner basin borne by a small forest of diminutive columns. The fountain is ascribed to the Pisanos and Arnolfo del Cambio. Adjoining the Palazzo on the opposite side is the old Chamber of Commerce, three rooms only of which are shown to the public. In one the walls are covered with fading frescoes by Perugino, and the elaborately-carved and inlaid wood-fittings are said to have been executed from his drawings. The adjoining room is a little gem. It was used as a chapel in those good old days when a priest even was needed to help the merchants beat each other at trade. One side is occupied by the altar-piece, all aglow with gold and enriched mouldings, enclosing three fine, warm-toned paintings of the Annunciation and the Baptism, which the apoplectic old guardian assured us were by Perugino. Raphael possibly had a hand in the decoration of the vault arabesques and richly-colored frescoes on a gold ground. The room is in almost perfect preservation, and alone is well worth the visit to the city.

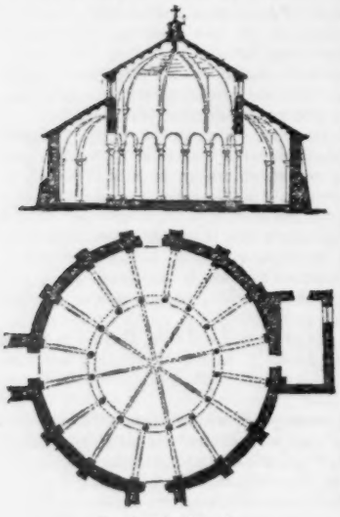


Vault Decoration, from the Chapel of the Exchange, Perugia.

The Perugians seem always to have had a decided taste for color, and to have indulged it pretty freely when a good opportunity presented itself. Turning out of the Corso, passing under the clock of the Palazzo Publico, and descending a street full of mediæval reminders and quaint nooks, one comes to a little green, opposite which is the oratory of San Bernardino, with a small façade, every inch of which is covered with bright color. The scheme is quite simple: a central doorway, two rows of side niches, and across the whole a cornice and pedimented gable; but the soft yellow tone of the once white marble, the deep-red of the terra-cotta plaques and arch ornaments, the pale blue grounds to set off the statuettes, and the occasional bits of colored marbles and mosaics, combine to render the front an exceedingly interesting piece of polychromatic work. It does not take a great deal nor a great variety of color to produce a good effect, and yet how hard it seems now-a-days to combine architecture and decoration as successfully as we find them united in this case. There is just the right yellow to give depth to the blue — always a difficult combination — and the few touches of gold about the angels' heads over the niches and around the arch are just enough to brighten the ochre tones and intensify the terra-cotta red. And if memory serves me rightly, the door adds another note to the harmony, being painted a dull green, a homely color in itself, but toned aright by time and the storms. Perhaps this façade was not as entirely harmonious when it was fresh and new. A restorer has been working at it lately, cleaning the marble and brightening some of the colors. His work thus far does not promise very happily, but as it stands now the oratory presents surely a most pleasingly soft and mellow effect.

At the end of the spur of the city which stretches out toward Assisi is the old monastery and church of San Pietro de' Casinensi. The church is of the basilican type, with a richly-gilded flat ceiling and a double row of antique columns, stolen from somewhere and rearranged for the church with the easy adaptability which characterizes so many of the edifices of this description. Outside, in the court-yard, is the church-tower, rising nobly above the monastery roofs, a simple but rather interesting mixture of Gothic feeling with half-understood Classic forms. Diagonally across the city, at the other extremity, is the little church of San Angelo, a circular edifice somewhat on the plan of San Stefano, at Rome. Since the time of Constantine the Italians have never been really good constructors, but occasionally one comes across a clever bit of construction such as this, which though Italian, strongly suggests a northern origin. The central portion of the church is about twenty-seven feet in diameter, around which is an aisle less than twelve feet wide. Separating the two are arranged sixteen antique columns, bearing a series of arches

and a clerestory wall. But instead of covering the central space with a masonry dome, which they probably did not dare to construct, or a flat roof, which they did not want, the builders threw light, brick arch ribs across from over each alternate column. On these were placed the horizontal purlins directly bearing a light wooden roof-covering. The aisle was treated on the same principle, by turning half rib-arches against the spring of the central ribs. The strains were thus carried from the centre to the outer wall, and thence to the ground by aid of wide buttresses. And finally, fearing, perhaps, an inequality of load on the central ribs, a brick drum was built up over the intersection, for a counterpoise. As it stands now, the construction does not present a very elegant appearance, but it is light and strong, besides being easily built, and the idea is surely a good one, capable of being adapted to produce a very pleasing interior effect.



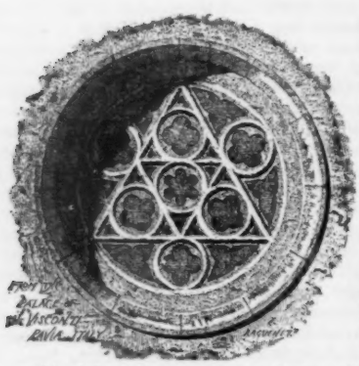
San Angelo, Perugia.

Just north of the cathedral is a long fragment of the old Etruscan or Roman wall, with a fine, arched gateway, locally known as the Arco di Augusto, a great, massive structure, just such as one reads about in Bunyan's "*Holy War*," or Froissart's "*Tales of the Crusaders*," with battered walls full twenty feet through, and a wide-springing arch. Above is a row of stunted pilasters and a few half-closed peep-holes, while on top of one of the projecting battlements is a pretty Renaissance loggia, added since the city has passed by the old barriers. It makes an interesting picture, with the little glimpse of the steep road leading in through it, and a lofty tower rising from somewhere away above and beyond it. Perugia abounds in such picturesque bits and unexpected combinations, and a week soon slips away while one is rambling about the old town, picking up an idea here or a suggestion there, and filling one's sketch-book with fragments of quaint antiquity.

C. H. Blackall.

HEINRICH, FREIHERR VON FERSTEL.[1]

(1828–1883.)



More than a year has passed since a cruel death removed our never-to-be-forgotten friend and colleague, while yet in the prime of life, from the scenes where his great activity and creative power had achieved so much. Even after this lapse of time, it seems to us as if that which had happened so suddenly and unexpectedly could not be true; as if that amiable man, so untiring in his labor, must still be among us. And indeed it is a rare thing that the phrase "an irreparable loss," which we lightly use so often, has so deep and lasting a meaning as in this case.

As yet no one has been found to take the place of him who is gone, either as teacher or in the numerous scenes of his public activity, in his professional intercourse or in society. How, indeed, can we ever hope to replace completely any artist possessing such versatility and such harmony of endowment and culture? For we may mention at once that these constituted the great importance of Ferstel's personality. Many of his Viennese colleagues are of equal rank, and are equally honored, each as the representative of a certain artistic tendency, to which he holds fast, and which he defends by word and deed, as though it were a confession of faith. Ferstel, on the contrary, in all that he did and thought, took the freest and broadest view of his profession as an artist. Like Leo Battista Alberti, he did not look upon architecture merely as a limited branch of art, to be followed as a trade. He regarded architectonics — to use the Hellenic term — as the *Erztektonik*, the guide of all other arts, the power which regulated life. Not only in temples and palaces should architecture be the expression of man's dignity and intelligence, but in all the forms and the surroundings of his daily life. In every direction, as far as his sphere of activity reaches, should the influence of architecture also extend, bringing with it order, proportion and beauty.

Such a broad and lofty conception of architecture could not have been formed, and could not have expressed itself, anywhere but in

Heinrich, Freiherr von Ferstel.

the soil of a capital city. The immense changes that have transformed Vienna during the last ten years have left it the most beautiful modern town in Europe, and among the many great talents which strove to carry off the palm, they called forth an artist in whom the nature of a man of the world was blended with the peculiar individuality of a Viennese. In this respect Eitelberger is quite right, when, in his essay on Van der Nüll and Siccardsburg, he calls Ferstel "the most remarkable architect whom the Viennese school has produced."

It is peculiarly interesting to compare Ferstel as an artist with the most remarkable modern architect of North Germany, Gottfried Semper. Much sympathy existed between these two men, and Ferstel, in his lectures, frequently adopted Semper's arguments. In his opening speech as Director, in 1880, he ranks him with Schinkel as leading the new school of architecture, and it is certain that he was himself considerably influenced by him. In Semper we also find the unmistakable stamp of a man born in a large city; but it was the spirit of a commercial town which animated him (he was born in Altona, at the gates of Hamburg), a spirit ever gazing longingly into the far distance. And this it was that caused him to leave his home for Paris, and led him to the south, to Dresden, to England, to Switzerland, and at length to Rome, the home of all his ideals. Here the tireless wanderer found an eternal rest at the foot of the Pyramid of Cestius. The North German master was constantly occupied, not only with his practical work but with theoretical work as well, with historical research and with the preparation of his book on Style, which is a marvelous fabric of philosophic art-knowledge, set forth in individual and pregnant language. Ferstel, on the other hand, we see growing up and taking firm root in his native soil, and, as a true child of Vienna, turning all the rich treasures of his heart and brain into forms of grace and loveliness, into noble ornaments to decorate his native town. This marked natural trait, mobile freshness and gay amiability, displayed even when his mood was serious and full of sentiment, cannot be too strongly insisted upon in characterizing Ferstel. It is a trait which gives him a close spiritual likeness to Schubert and Grillparzer, and is synonymous with the real Viennese spirit in the best sense of the word.

Ferstel did not compete directly with regard to the plan for enlarging Vienna, being prevented by his work on the Votivkirche and on the Bank; but he penetrated at once to the heart of the great task, in one of those clever little literary works, several of which, devoted to the vital subject of Vienna's improvement, we possess. I mean the pamphlet he published in 1860, in collaboration with Eitelberger, on the "*Dwelling-House*," in which he declares war against our great speculative barracks, and, in pleading for the erection of true homes, gives us reasons which are well worthy of being taken to heart. His suggestions met with approval from the public, and were widely discussed by the profession; but, as Ferstel's fellow-worker expresses himself, "The Board for the improvement of the town laid them respectfully aside," and even to this day the words hold good that "the question still remains unanswered, how one can in Vienna build

[1] A memorial address by Carl von Lützow. Translated from the *Zeitschrift für Bildende Kunst*, by F. J. Ancketill.

well, cheaply, and in a manner suited to the people." Ferstel, as we know, did not allow himself to be discouraged by the difficulties and obstacles he met with; that which he did not achieve at the first attempt he did achieve at the second, in the founding of the Cottage Quarter by Währing, for we must look upon Ferstel as the real originator of this work. The artist did not desire merely to create a group of pattern buildings which were to realize his ideal of a dwelling-house; he wished at the same time to give an example of how a stop might be put to the wild architectural practice then in vogue in the suburbs of Vienna. We find Ferstel's ideas on this subject — one of the most important as regards the further improvement of the town — in a memoir on a general building-plan for Vienna, which was published in 1877, by the Austrian Society of Engineers and Architects. In this work he says: "The outskirts and suburbs of our town have been extended in a manner which, as regards want of plan and absence of taste, far exceeds anything yet produced, either in our country or elsewhere. A visit to most of the principal towns in Germany, France and England shows that wherever space could be procured in the circumference of the original old-town, the finest quarters have sprung up; also that all conditions of comfort and health have been considered more than would be at all possible in the more densely peopled portions of the city."

Only a short time before his last illness, Ferstel took part in a new creation in connection with these ideas: the laying out of the park on the Türkenschanze. This plan is the last which we have from his hand. The site, one which commands the most beautiful view in the immediate vicinity of the town, had long lain waste and had, two hundred years ago, been wrested from the Turk by the German sword. Here Ferstel also wished to erect a memorial of the freedom of the city. But especially he looked with prophetic eye at a picture to be realized in future ages — the picture of the city striving for air and light, and stretching out her arms to the mountains.

Let us place ourselves in imagination on those heights, and look down upon Vienna with its sea of houses spread out before us, its towers and domes so manifold in their forms of spires and vaults. Then we understand that, with a nature so rich and so filled with the ardent desire to create as was Ferstel's, with a heart so appreciative of progress in all things, of existence and of beauty as was his, it was impossible for him to be a severe respecter of styles. The opinion he expressed in the lecture already cited as to what should be the architectural education of to-day, holds good, also, in all essentials with regard to current architectural practice as he understood it. He says: "It allows the individuality of each to develop freely; it is not dogmatic, but historical." And he adds: "As men's works combine to form their history, thus architecture will appear as a chronicle of the world in stone." Ferstel himself had explored in thought many centuries of this chronicle, and awoke its spirit to new life in his creations.

His youth was spent amid the "storm and stress" of the revolutionary period of 1848. Both the bureaucratic tutelage of official architecture and the autocracy of that academic antique, which had degenerated into a mere bloodless phantom, now received their death-blow. Mediæval, and especially Gothic art, supported by the revived national sentiment of Germany, made its way not only into the study of the scholar, but into the workshop of the architect. Georg Müller had taken the lead in this movement, by erecting, in the spirit of the Italian Romanesque style, the beautiful Alt-Lerchenfelder Church. And when there was a competition for the building of the Votivkirche — open competitions for public works dating, by the way, from that time — none but the Gothic style could be chosen. This was the universal conviction alike of the artists and laymen, at their head standing the young Archduke Ferdinand Max, who, as protector of the whole undertaking, gives vent rapturously to his views on this subject, in his first appeal, dated February 23, 1853. Apart from the inner necessity which caused the age to choose inevitably the Gothic style, a great artistic and technical advantage for Viennese architecture lay in the necessity that the structure should be a logically developed work in *stone*. For more than a hundred years before the foundation of the Votivkirche, no really monumental building entirely wrought of stone had been erected in Vienna. The finest building materials, offered in abundance by the country round Vienna (the limestone of Brunn and the lime and sand stones of the Leitha, etc.) had lain unused or had been lost under miserable plasterings. And any one who compares the Vienna of to-day with the Vienna of that time, cannot but remark with satisfaction the great progress we have made.

With stone architecture, the technique of masonry with its practical school, the *Bauhütte* (fraternity of building masons) found their entrance into Vienna. It is a well-known fact, often referred to with gratitude by Ferstel himself, that no one deserves more credit in connection with this important part of modern Viennese architecture than Joseph Kranner, for many years director of the *Bauhütte*, for the building of the Votivkirche. Ferstel's own words on the subject are as follows: "In his admirable practice, which reminded one forcibly of a mediæval master, I stood beside him at first merely as a willing pupil." Our artist here refers to *constructive* problems, to the organization of the Bauhütte, to the choice of materials, etc. As far as the *artistic* portion of his task was concerned, Ferstel had perfectly understood himself, even in his early youth. At the request of the Assembly of German architects, in 1865, he gave in very decided language his reasons for the choice and the treatment of the style adopted in the Votivkirche; it was a positive necessity for him to defend, in an intellectual manner, the course he had taken. He said in effect that he could decide neither upon the early Gothic nor upon the style of the latest Gothic period. In the former the constructive system had but just declared itself as such, while in the latter it had degenerated into a "decorative scheme," and had lost itself in lawlessness. Both extremes were to be avoided. "I decided on the art of a time between these two periods, a time when style had thoroughly pervaded construction, yet when each constructive element still preserved its significance." In other words he decided on the style of that Franco-German flower of Gothic, in which construction had wholly become *an art*, and every element of the building's spiritualized form had assumed a plastic shape. Hence his further conviction that the work could not be confined to the structure proper, but that a wealth of ornament and of representative art must adorn the exterior, and lend to the interior both charm of color and spirituality of character. Thus each individual part combined to form that great work of art which is now complete before us. I dare not think of attempting to name all the artists who worked at this shrine, which contains the jewels of Viennese art and industry. Führich, the greatest ecclesiastical painter whom Austria has produced, is at their head, and hardly one of those able men whom Vienna has to thank for the present flourishing state of her art-industry is missing from their ranks. During these long years of serious and successful effort they have all looked up to the departed master as to their leader and their guide.

In the bank already briefly mentioned, which was built between the years 1856–60, Ferstel had already shown his delicate feeling for decoration, and had proved the truth of the law, that only in association with its sister arts, not in cold isolation, can architecture hope to attain its aim. The most favorable opportunity for realizing his ideal was offered him in the construction of the Austrian Museum, the very founding of which had been due to similar convictions. It was begun in 1868 and finished in 1871.

In the features of the Bank we note already a trace of Southern art — of the influence of Orcagna, combined with the views of our native Romanticists. During the building of the Archduke Ludwig Victor's palace, which took place between the years 1863–66, the change in our artist's views was completed; his Gothic period lay behind him. In the creation of the Austrian Museum, Ferstel proved himself a perfect master of the Italian Renaissance. The colonade of this museum is perhaps the most beautiful design in this style of which modern architecture can boast, and it is, in my opinion, without doubt the noblest and most charming of Ferstel's work. The main idea of the plan — the direct connection along the main axis of the building, of vestibule, court and staircase — had been inspired by the palaces of Genoa, the chief beauty of which, as is well known, lies in the construction of such vestibules and stairways. But the treatment of the motive, the way in which the central portion is connected with the wings, away that for clearness of effect and for compactness could hardly be imagined better, and, finally, the artistic development and adornment of the adjoining apartments, and especially of the great colonnaded court — all these bear so legibly the stamp of Ferstel's individuality that they may serve as a model of the manner in which a modern artist should bear himself in presence of the legacy of his predecessors; learning from them and yet using his own creative powers. The style of the arcaded court breathes the spirit of the early Tuscan Renaissance; and from the vaults of the light two-story columned halls the delicate grotesques look down upon us with those fantastic figures which Raphael and Giovanni da Udine called to life from the baths of the ancients and made the good genii of a decorative art as attractive as it is free from empty pomp and show.

We see this fresh, youthful Renaissance style reaching a masculine and noble beauty in Ferstel's University, the last and grandest creation in secular architecture which he bequeathed to us. Palladio's and Scamozzi's designs guided him in his conception of the exterior. For the plan of the great court there was only one model in accordance with which he could arrange the features of his mighty men — Sangallo's and Michelangelo's Court of the Palazzo Farnese in Rome and its prototype the Marcellus Theatre.

He who knew Ferstel and saw him engaged during years of ceaseless study, in striving toward his lofty goal, can understand the great difficulty of meeting the needs of a modern institute of learning, while at the same time drawing correct artistic inferences from the history of the past with regard to the aspect which the work in its entirety should assume. What he offers us in the finished building rises again far above the mediocrity of borrowed beauty and attains to a quite peculiar expression of his individuality. To the serious fundamental tone of the Roman Renaissance he added an accent of grace which was native to himself, and there is also often something to remind us of the delicate work of the Viennese artists of the last century, but always without the least degeneration into *baroque* details. And over the whole there broods a spirit of purity and nobility such as should pervade a home of knowledge. In the interior arrangement of the Austrian Museum Ferstel had already shown his talent for creating beauty with proportions great in scale. The superb staircases and broad-vaulted halls of the University are his masterpieces in this direction, and place him on a level with the greatest architects of the past in all that concerns the art of composition. The task of adding to these noble halls that profusion of pictorial decoration which Ferstel intended them to receive, is reserved for his successors, and we may hope and expect that no one

will hinder or limit them in the performance of the duties bequeathed them. We envy our young men the possession of such rooms for study, the mere aspect of which should ennoble their spirits and turn their minds toward a lofty aim.

In finishing the interior of the University Ferstel took the opportunity to prove his power in a department where he had already more than once distinguished himself — I mean in brick construction. His Chemical Laboratory and the Austrian Museum, together with the School of Art adjoining it, are among the most successful modern works in this material, to the simple beauty of which our eyes have but recently been opened. In the University the lateral courts are carried out in brick. Ferstel understood, as did no one else, how to give the hard, inflexible material life and charm, either by the rhythm of his masses or by the assistance of decorative painting, glazed terra-cotta, *sgraffitto* work, etc. Not only in stone, but also in brick construction was he a reformer.

How could one conceive of an activity which at every step shows the artist united to the student, imagination joined to reason, except as based upon the most comprehensive culture? A glance at Ferstel's life shows with what care he strove to educate himself in all technical and scientific branches. His studies at the Technical High School of Vienna were followed by an academic period, during which the young artist not only worked in his own branch at the School of Architecture under Van der Nüll, Siccardsburg and Rössner, but also, between 1845–48, profited by the teaching of Kupelwieser and Ender in the night classes of the School of Painting, and practised drawing from the antique and from life. Ferstel's Italian sketch-books — numerous leaves of which were shown at the exhibition of his works in the Austrian Museum — reveal the fruits of these studies, and bear witness especially to his lively feeling for landscape beauty, while at the same time we recognize that the eye of an architect had dictated the choice of motive and guided its rendering. During his academic years Ferstel also followed at the University certain courses which seemed to him important. How many-sided was his knowledge in every department with regard to the practice of art and of art-industry, how profound his acquaintance with the art of the past, especially with painting and engraving, all can recognize who were among his friends and who know the valuable collections of pictures and engravings with which, particularly in later years, he occupied his leisure hours.

I have already mentioned his relation to Joseph Kranner — a bond of friendship which caused the younger artist voluntarily to accept the position of an aid to the elder. The sympathy between them resuscitates, as it were, a bit of the old guild life of the Middle Ages, and in Ferstel's own life we have much that is analogous with those family ties of olden times, when the talents of the father or uncle were often inherited by the children, and when relations of the same generation helped and advised one another. While still very young (1851–53) Ferstel received support of this kind from his uncle, Friedrich Stache, the founder of the *Künstler Haus* in Vienna. The numerous plans for building and restorations ordered by the Princes Lobkowitz and Kinsky, the Counts Claue-Gallas, Nostitz and others, which were being worked at in Stache's office, gave his nephew an early opportunity of occupying himself with practical work, and hastened the development of his great talent, which Stache soon recognized and all his life tried to cultivate and assist. A second and very similar bond of sympathy, and an invaluable one for Ferstel, was his long association with his brother-in-law, Charles Köchlin, who in 1856 was his assistant in the construction of the Bank, and who after 1872 was always at his side. During Ferstel's last few years especially, Köchlin shared with him the great responsibility of the University building, which he is at present finishing alone.

In all the relationships of life we find the master preserving the fundamental qualities of his character — gratitude and devotion to true merit, regard for the most delicate social forms, without any loss of the dignity which his remarkable talents justified. In his intercourse with his scholars he was kind, but strictly conscientious, and had the power of inspiring them with enthusiasm for their noble profession. From their ranks was formed a staff of young architects and teachers who, at Ferstel's side and under his intellectual guidance, helped to produce the flowering of Viennese architecture. We may count upon them as the heirs of his artistic views and the true followers of his doctrines.

It was sometimes thought strange that Ferstel, occupied with teaching, taking a lively interest in public life, and in the management of innumerable institutions and societies, should still continually take part in new architectural undertakings and competitions — as, for instance, in the competition for the Lloyd buildings in Trieste, in which he gained the prize, and last year in the competition for the Parliament House in Berlin. But it is just this unquenchable creative impulse which in my eyes characterizes Ferstel's as a God-given talent, for, to use Otfried Müller's classic words: — "It is the constant desire to *create* which alone makes an artist!"

If, in conclusion, we ask ourselves what position our master fills in a general history of Art, and more particularly that of our own time, we may mark two qualities as his especial characteristics — his profound scholarship and his *modernité* of spirit. The former gave him a deep knowledge of the noble traditions of the ancients, while the latter kept him in continual and lively intercourse with the world about him, enabled him to feel with sympathy all contemporary things, and inspired him with the free unprejudiced spirit which he manifested in the most diverse situations of life. In To-day he saw the continuation of that youthful period of the modern mind which in the fifteenth century passed from Italy to the rest of the world. To quote his own words: — "The discoveries and the diffusion of the positive sciences and their influence in all the circumstances of life increase daily. All industry and trade receive a new impulse from science, that lamp which illumines our century. In all that concerns social questions the world is slowly but surely becoming wiser and especially more humane." The whole individuality of our friend was the expression of these confident and hopeful views, and his works bear witness to them in the noblest way.

See how outside the Schottenthor his Gothic church now stands, surrounded by a group of dwelling-houses and monumental structures, varied in form and style, but all infused with the same artistic individuality, and arranged upon an harmonious plan with their charming gardens about them — a coherent artistic creation of Ferstel's. It is no showy palace which has been conjured out of the desert by autocratic caprice, like the palaces and parks of the last century. It is a creation of a distinctly ideal stamp — placed in the centre of the crowded capital, and yet marked by the consecrating impress of genuine art. And a particularly strong evidence of the change that has come to pass is afforded by the fact that there is room *for the artist himself* in his creation. He no longer disappears in the dust of the workshop, nor does he need to hide from the powdered scorn of courtiers. In the very heart of the quarter stands his own dwelling, the home of a blooming family, watched over by a noble wife — an artistic home, without pomp or show, but the worthy abode of kindness and sociability.

Verily our friend was right when he gazed with so confident an eye on the march of time. And we, who have been and are the living witnesses of all the noble and beautiful creations with which our time has adorned our city and the Fatherland, must not lose hope and confidence in the future because of the blow we received by Ferstel's death. That which the great master accomplished by constant effort and conflict forms our pride and joy, encourages emulation in our young artists, and will be a glory to Austria through all the coming centuries.

THE ILLUSTRATIONS.

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

COMPETITIVE DESIGN FOR STABLE NEAR ST. PAUL, MINN., BY "*Hope.*"

FOUNDATIONS.—Build a dry wall under the stable portion 1′ 6″ thick, of good stone and high enough to make a cellar 6′ 6″ in the clear; the rest to be a trench wall and built deep enough to go below frost. All stone to be faced and pointed on the outside above grade. Do all digging and grading. Build a chimney of good hard-burned brick. *Framing.* — All framing to be of good sound spruce, braced and pinned. *Boarding.* — All roof and wall boards to be of good sound hemlock; also, under floor-boards of first and second stories. Upper floor-boards to be of sound spruce in both stories.

Outside Finish.—The outside finish to be good pine or white-wood, including gutters, conductors, brackets, etc. Build a ventilator on roof; sawed cedar shingles. Build both inclines of spruce; selected spruce clapboards. *Windows and Doors.* — Window-frames to be sound pine with hard-pine pulley-stile. Window-frames to be of pine 1½″ thick and glazed with first quality single-thick German glass. Door-frames to be of pine. Doors on the inside will be mill doors, 1½″ thick, except sliding doors, which will be sheathed. Outside doors will be sheathed with pine.

Inside Finish. — Walls and ceilings of carriage, man's, and harness rooms, horse and cow stables will be sheathed with best spruce sheathing. Build ventilation-shafts and connect with ventilator on roof. Build washing platform with a gutter. Fit up a water-closet under stairs. Build a flight of stairs. Fit up harness-room with a sink, harness-case with glass doors, and a pole on iron brackets. Fit up horse stalls with wooden mangers and iron hay-racks; build stanchions for cows. There are to be grain-chutes with slides on first floor, and connected with bins above. Build hay and manure traps. Sheathing between stalls to be of sound spruce. Build a seat in man's room and fit up closet in same in the usual manner. Put in gas and water pipes.

Hardware. — There is to be good and selected hardware used.

Painting. — All inside work in first story and man's room to have two good coats of shellac. Outside finish to be painted two good coats any color desired. Shingles on roofs and walls to be stained and clapboards to be painted.

Miscellaneous. — Fit up a drinking-trough in stable. Build a blanket-rack in carriage-room.

The cost of this stable was carefully estimated, and is to cost complete as described the sum, viz.: $1,441.00. "*Hope.*"

THE CATHEDRAL OF ST. SAUVEUR, BRUGES, BELGIUM.

This building, which has the distinguishing characteristic of being built of brick, was built between 1482 and 1527, the choir being the oldest portion of the structure.

A STREET IN HALBERSTADT, GERMANY.

No. 491 American Architect and Building News, May 23 1885

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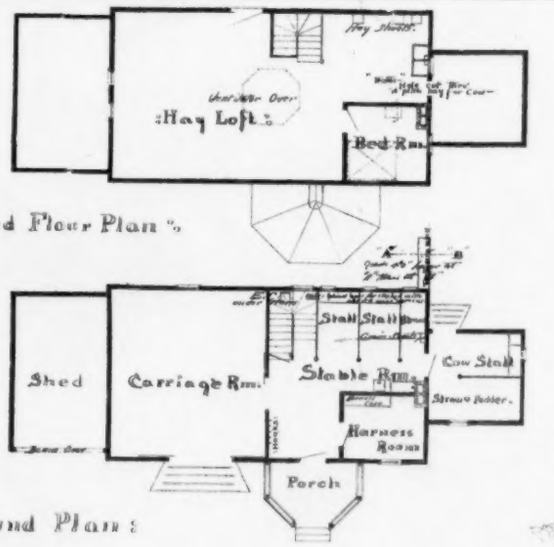
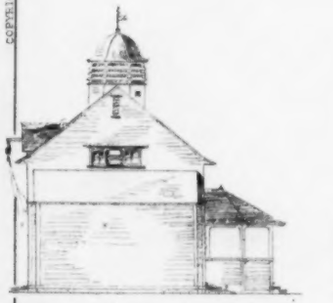
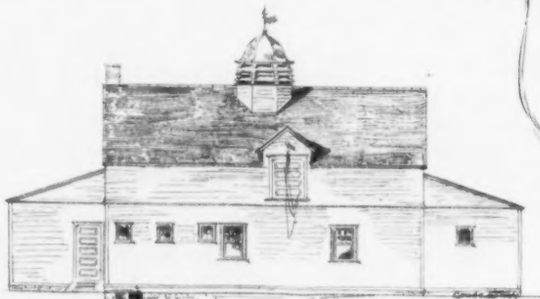
American Arch't Competition — $1500 Barn



Design Submitted by "Hope"

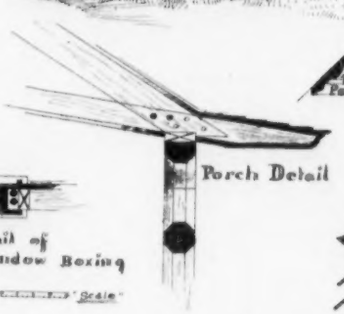


Side Elevation



Rear Elevation

Detail of Window Boxing



Porch Detail

Design for Ventilator

Moulding for Porch & Ventilators

Moulding for Main Cornice

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Old Houses, Halberstadt, Germany. – 1884.

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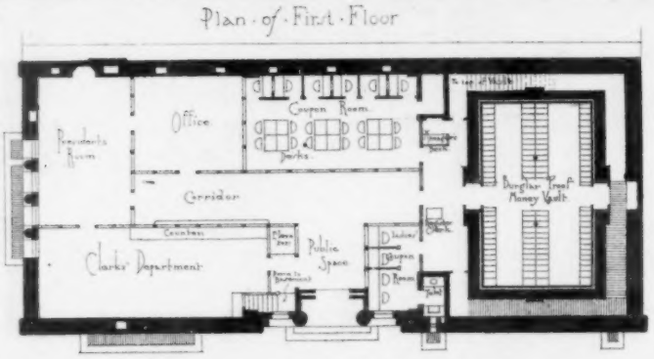
Plan of First Floor



THE MERCAN
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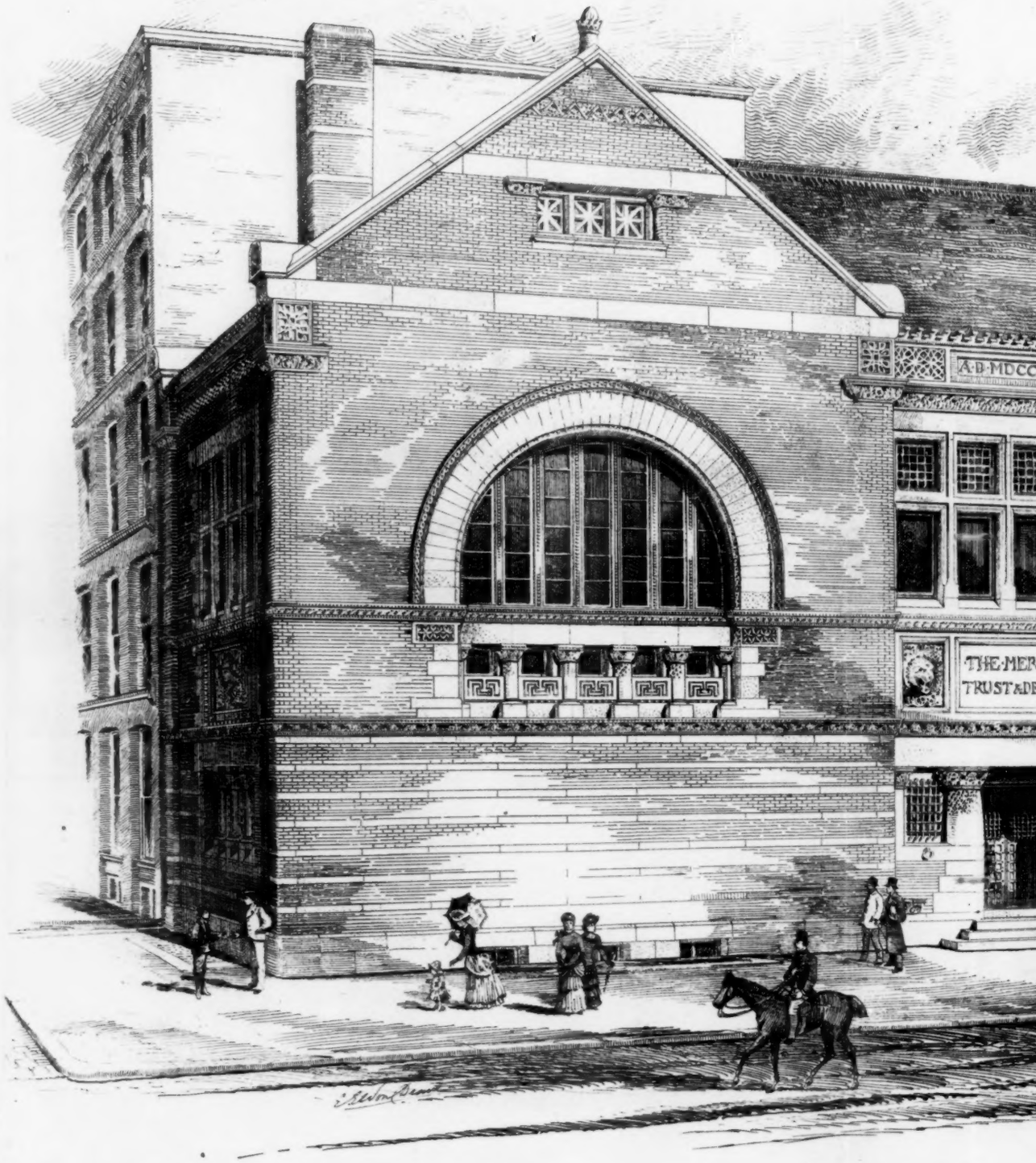
BALTIMORE
Messrs Wyatt & Sperry



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& DEPOSIT·Co
TIMORE·Md
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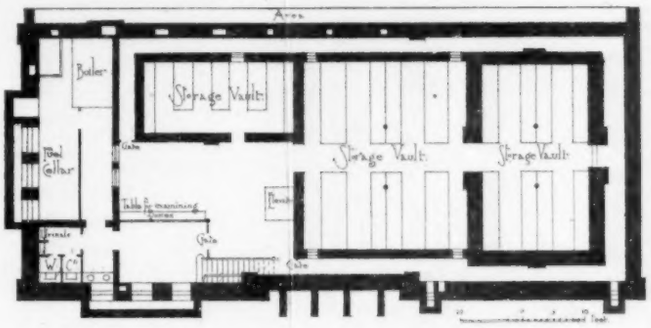
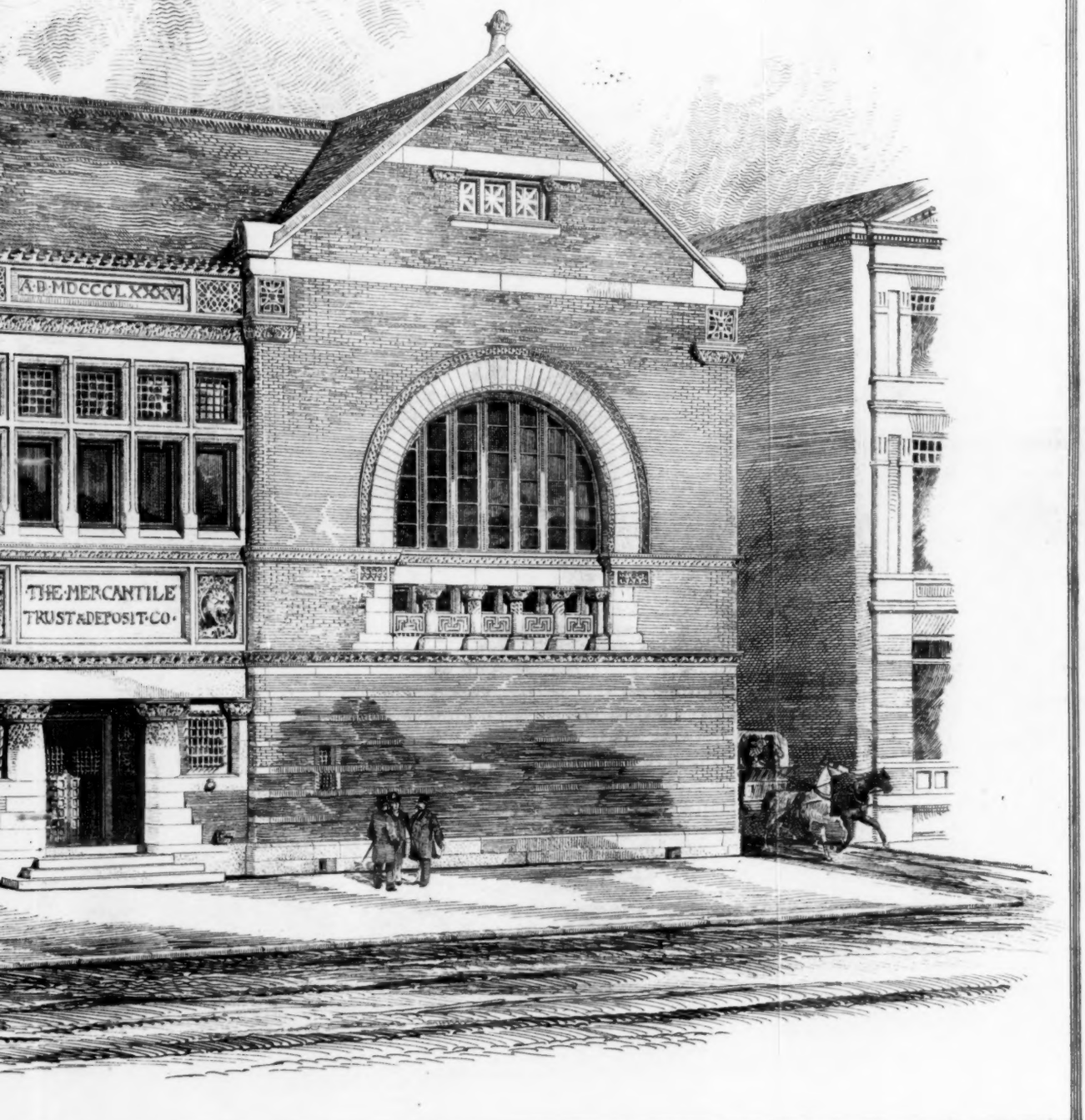
Plan of Basement Floor





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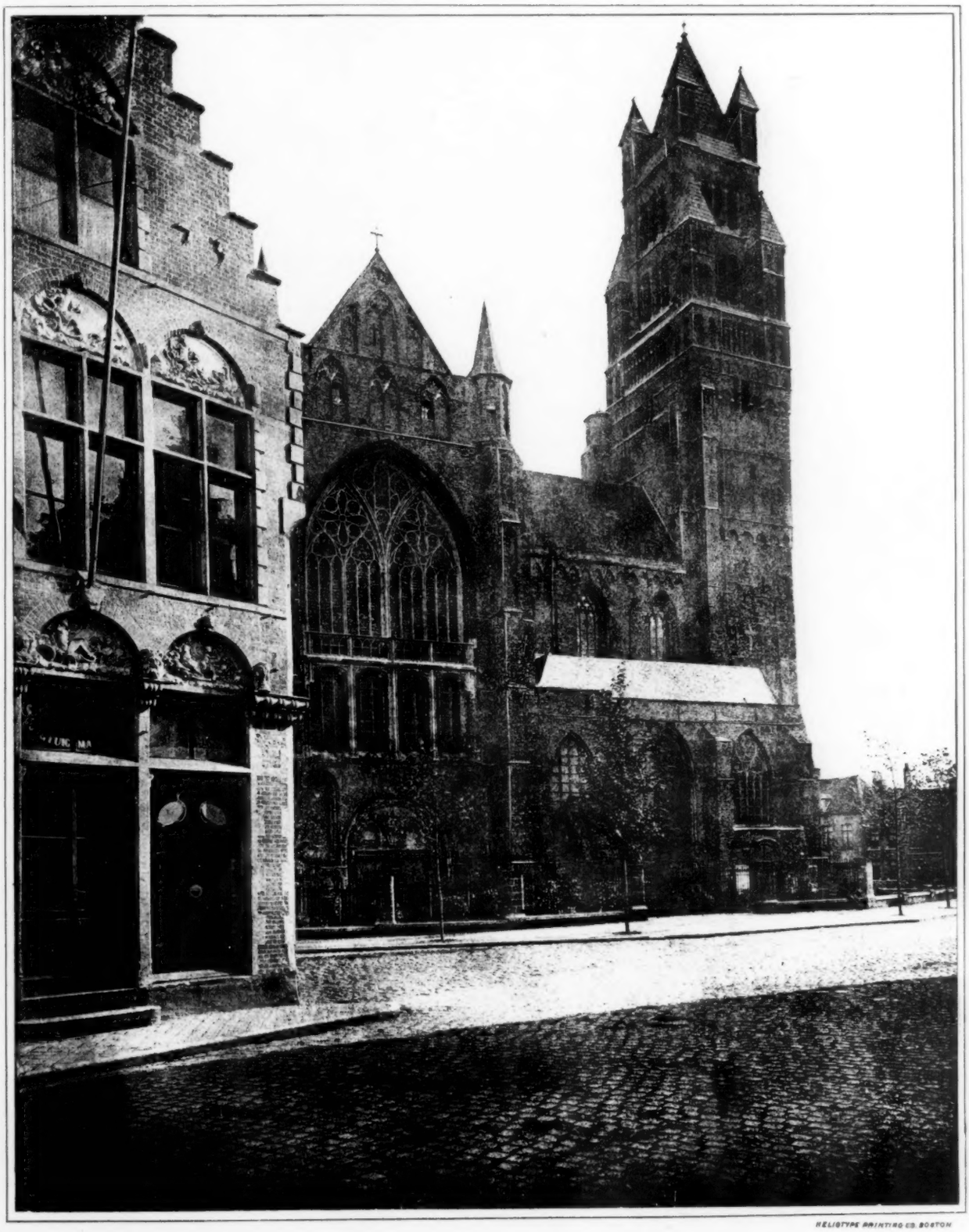

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CATHEDRAL OF ST. SAUVEUR, BRUGES, BELGIUM.—1884.

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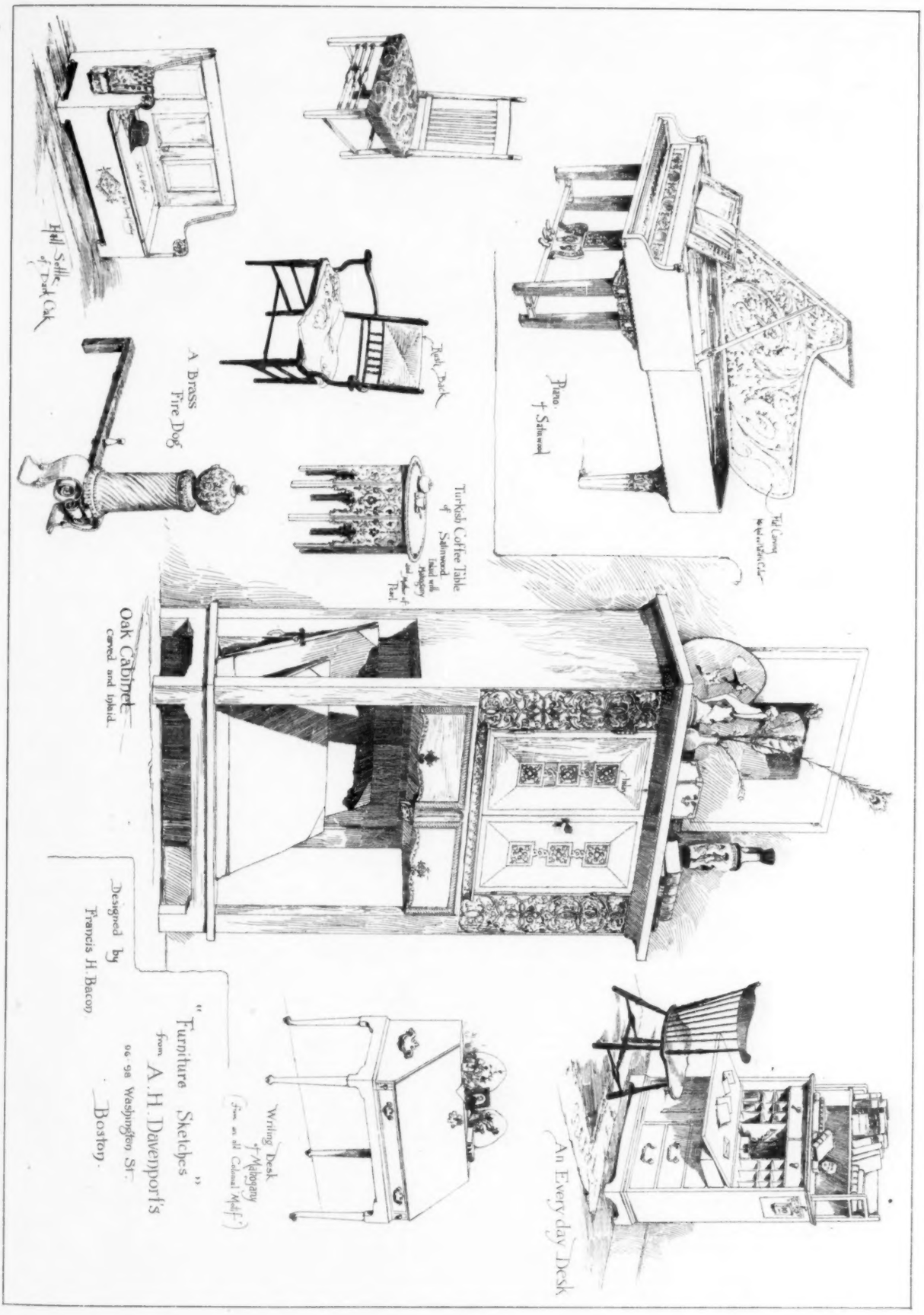
Hall Settle of Dark Oak
Rock Back
A Brass Fire Dog
Piano of Satinwood
Turkish Coffee Table of Satinwood
Oak Cabinet carved and tiphid.
Writing Desk of Mahogany
An Every day Desk

"Furniture Sketches" from A. H. Davenport's 96 98 Washington St. Boston.

Designed by Francis H. Bacon

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THE MERCANTILE TRUST AND DEPOSIT COMPANY'S BUILDING, BALTIMORE, MD. MESSRS. WYATT & SPERRY, ARCHITECTS. BALTIMORE, MD.

CONCRETE AS A BUILDING MATERIAL.[1]

THE reintroduction, about twenty years since, of concrete as a material for building walls, erceived at the time considerable impetus from two causes. 1st. The invention of appliances or moulds for forming the structural portions of buildings of a monolithic character. 2d. The superior properties possessed by Portland cement as a matrix in place of ordinary lime. And as an important addition to our stock of building materials concrete would undoubtedly have received more public attention, and become more generally adopted, if it had not been subjected to the fate of most inventions — for, as usual, we were told that concrete was to be the salve for every sore in building operations; there were to be no more damp walls or tumble-down walls, for it was impervious to moisture, and I don't know how many times as strong as any brickwork. Mechanics would be no longer needed, for the appliances could be fixed and the work executed by any ordinary laborers; while its cost was less than one-half that of the commonest specimen of brick-walling. Many other improbable statements of a similar character were made public, one enthusiastic concrete builder offering, in a trade journal to prove, or otherwise to forfeit a considerable sum of money, that concrete was ten times stronger than any other building material; while, on the other hand, a concrete building in course of erection by the same individual soon after collapsed without any apparent cause whatever. But the remedy for all this clap-trap was simply a question of time, and, as a matter of course, we do not now hear such extraordinary statements as these put forth. Concrete is now simply recognized as an important addition to our building materials, and a valuable factor in construction under certain conditions, and its employment for many purposes in connection with building is perhaps more extensive and more varied than many are aware of. Its introduction as a wall-building material served a good purpose in certain ways. For example, previous to then, little care or trouble was taken in many instances about the concrete used in foundations, the fact being that no means existed to test its quality or strength after it was buried in the trenches dug for its reception. The usual formula of a certain proportion of Dorking lime and Thames ballast, to be well mixed and thrown in trenches from a certain height, was the sum and substance of many specifications for ordinary buildings, and in some instances is so even now. But the quality of the concrete used in foundations is equally as important a matter as if the walls themselves were to be constructed of the same materials, especially with buildings of considerable altitude, or where the ground is of a treacherous character. The knowledge gained from experience of the immense strength possessed by good concrete has engendered various considerations in connection with the ordinary system of executing foundations and footings of walls; for instance, assuming that the concrete in foundations is of first-class character, it is submitted whether brickwork footings which are intended to distribute the weight of the walls over a greater superficial area, and which are not calculated to be of any practical use in strengthening them laterally, are of any service whatever when the sustaining medium (the concrete) is incapable of yielding from the superincumbent load it has to bear. And, again, whether it would not be practicable in many cases, as for instance in clay soil, to excavate the ground of a wedge-shape section, the large end downwards, reducing the thickness of the concrete at top to that of the wall itself, or somewhat more, and increasing it at bottom so as to give the foundations themselves a broader base, and thereby more correctly define, without any increase of materials, the principle of correct distribution of strength. Practically the foundations of walls should not be dependent upon the ground for lateral support; they should be strong enough to permit the soil on either side to be excavated to the bottom of foundations, if needed, after the building has been erected, and without a possibility of danger. But how many new buildings would be safe under this ordeal? The difference of cost between good and bad concrete is so little that there is no excuse for an inferior material for foundations in any building with a claim to substantiality.

There are many opinions and many delusions in connection with the apparently simple subject of "concrete"; for instance, with regard to the size of the aggregate, it is usual to specify that it shall not exceed certain dimensions, usually that each portion shall pass through a two-inch, or sometimes one-and-one-half-inch, ring, and even a one-inch ring or screen is not an uncommon stipulation, whereas, in point of fact, the larger a certain portion of the aggregate may be the better the concrete, simply because the larger the particles composing the aggregate, the less superficial area to be cemented by the matrix. In other specifications it is stated that the aggregate shall be of a certain uniform size, with a fixed proportion of sharp clean sand mixed therewith. This, especially if cement is to be used as a matrix, is entirely wrong; and another plan is to instruct water to be added to a measured quantity of aggregate, and the amount of the former needed to fill up the crevices of the latter is supposed to represent the proportion of sand necessary to add to the bulk. This is a fallacious system, because the sand could not by any means occupy the minute crevices available for water. Practically, what is required for an aggregate in good concrete as far as size is concerned, depends upon the thickness of the foundations, or walls, or floors, or whatever purpose it is required for, and no hard-and-fast line can be drawn for these relative dimensions; but whatever the size of the largest, the smallest should never be finer than Thames sand. The thicker the wall or foundation the larger a portion of the aggregate may be, because homogeneity is then rendered more easily attainable, the only limit to size being that homogeneity must be the first consideration.

Approximately, it might be safe to specify for work up to nine inches thick all that would pass through a two-and-one-half-inch ring, and, above that thickness, through a three-and-one-half-inch ring, conditionally that the intermediate quantities were so varied both in size and shape, that without any undue proportion of the coarse sandy element, the whole should, when subjected to gentle impingement be rendered perfectly homogeneous. I admit that in the absence of considerable practice, it requires some judgment to fix upon this condition of materials; but approximate results could be obtained by making up samples of concrete in boxes, each holding a cubic foot, varying the proportions, and when consolidated removing the wood cases, and breaking the cubes of concrete to pieces. The sample that was perfectly homogeneous, and which contained the least proportion of fine, with the greatest proportion of coarse materials, would represent the best consistency of aggregate for ensuring the largest amount of strength. And it must be self-apparent that the nearer each unit of the aggregate approached in shape to an irregular polygon the better the particles would interlock with each other, and for this reason sea-beach and river shingle never make the best aggregates; and breaking by percussion, such as by hard hammers, produces aggregates too uniform in size, and which require the fine and intermediate portions to be obtained by some other means and added thereto. Probably the best way of obtaining an aggregate suitable in size and shape, and, as a rule, possessing somewhere about the relative sizes and proportions, is to use a Blake's stone-crusher. Where this is done it will be found, however, that the harder the aggregate material to be crushed, the less the proportion of fine and intermediate sizes produced, and due allowance must be made in such cases by abstracting a portion of the finer quality, or adding some obtained from other sources, as circumstances may require; usually, however, the latter is unnecessary. Although it is customary in the neighborhood of London to employ Thames ballast for concrete, it is far from being the best material for the purpose; the harder variety of stones, hard brickbats, brick clinkers, coke, and slag, are all more suitable than flint or flinty gravel. In point of fact, old building-materials are often carted away as rubbish or for road foundations which would make most excellent concrete if broken up, and Thames ballast is as often brought miles, for an aggregate for the formation of concrete for new buildings to be erected on the same site. If a mass of ballast or flint concrete is broken with a sledge-hammer after complete solidification has ensued, it will be found that some portion of the gravel will show clean surfaces from want of perfect adhesion; with any of the other materials named, this is absolutely impossible if the concrete is executed under proper conditions. One of the most important factors in connection with a good aggregate is that it should be clean, and I can safely affirm that the more experience one has in the use of concrete, the greater will be the care taken to thoroughly wash the aggregate. And this is more essential where Portland cement is used than with lime, for as matrices they essentially differ from each other in their special properties. A small proportion of

[1] A paper read before the Society of Architects, by Thomas Potter, M.S.A., of Alresford.

fine sand may not be highly injurious in the aggregate if lime is the matrix, more especially as the proportion of the latter is usually greater than where cement is used; but with cement the case is different — it has but little affinity for any material as fine as itself, and it also possesses the strongest adhesive and cohesive properties when unmixed with sand. The usually small proportion employed also, ten to fifteen per cent, although ample to secure an excellent concrete produced under the best conditions, is insufficient to allow the presence of a quantity of deleterious foreign matter in the aggregate. If the material for aggregate is absolutely clean previous to being broken, it still requires washing afterwards; for the action of percussion, say, if reduced by hand-hammers, or of compression, if reduced by a stone-crusher, produces a quantity of dusty particles. The necessity for cleaning, where no foreign matter existed previous to the reduction of the aggregate, will possibly be disputed; but it can readily be proved by mixing samples of cement with the water in which some clean broken aggregate is washed, and testing the sample in a cement-testing machine. And as the cost of washing would but rarely exceed six pence per cubic yard, I submit the concrete is increased much more than that amount in value by the elimination of all the dusty and fine-grained constituents of the aggregate.

With regard to the matrices employed for concrete, there is a unanimity of opinion which admits of no doubt that for strength and other qualities there is nothing to surpass good Portland cement. But poor limes of hydraulic character, such as that made from lias limestone, possess very considerable strength, and are adapted not only for concrete in foundations, but for walls themselves. It can safely be affirmed that concrete made of a suitable aggregate, and ground blue lias lime, in the proportion of one of the latter to five or six of the former, is as strong as ordinary brickwork, and can be used for walls of any description where brickwork can be employed. But there is this difference in the natures of lime and cement, that whereas with the former a fixed proportion of sand is absolutely necessary for the chemical change which converts the lime into mortar, with cement the case is the reverse; for although the sand is essential to fill up the interstices of the aggregate next above it in size, it has the effect of weakening the adhesive properties of the cement. And here we obtain one of the main contributory causes to both good and bad concrete. Blue lias lime is supposed to attain its normal strength as a mortar when it is mixed with double its bulk of coarse sharp sand; when, therefore, the aggregate contains either more or less than this proportion of sand to lime, so is the cementitious nature of the matrix reduced, and a lime concrete composed of six parts of an aggregate to one of a matrix should therefore consist of one part of lime, two parts of coarse sand, and four parts of a coarser and irregular-sized material. With cement, on the other hand, the aim is, or should be, to do with as little sand as possible, but not to risk that *sine quâ non* of good concrete — homogeneity. It is a mistaken notion to suppose that lime used as a matrix will expand or "blow." It will undoubtedly do so if used directly it is ground; but it should be treated in the same way as cement, viz., spread out on a wood floor away from all damp, and not used for two or three weeks at least after having left the millstones, and there will be then no danger whatever from expansion. Nor will this cooling in any way lessen the ultimate strength of the lime, nor will it affect its setting properties so far as to render building operations tedious if employed for wall building; practically it requires about double the time of Portland cement to set or harden.

As blue lias lime is oftentimes procurable in neighborhoods where Portland cement is a costly article, it is somewhat surprising to find it so little used for concrete building; where, however, the cost of cement is not handicapped too severely by the expense of carriage, the gain in cost, all points considered, is but little. It is not an uncommon practice to employ lias lime concrete as an underpinning for walls of old buildings which have given evidence of sinking, using the lime fresh for the ostensible purpose of causing the concrete to expand, and thereby pin, or wedge up the building. This I submit is wrong in principle; the lime in no way causes the aggregate in itself to expand, but forces the particles asunder, and instead of forming a dense mass, creates fragmentary blocks, whose effect is entirely at variance with the object of the concrete. If we mould a sample of concrete made with fresh lime in a box, or frame, and when hardened take away the wood casing, it will sooner or later crack and split up into small portions. The practice of "packing" concrete — that is, depositing in layers, or otherwise, boulders of stone, or similar suitable materials in the soft mass — reduces the cost, and is by no means objectionable, provided it is thoroughly incorporated with the concrete itself, and this forming a portion of the aggregate, is simply an illustration of the principle that the larger a portion of the aggregate the better — always on the understanding that perfect homogeneity must not only be aimed at, but obtained. There are some objections to concrete as a wall-building material. For instance, it has an inherent tendency to show cracks on the finished surface, especially if stuccoed to a smooth and even face with cement. All building materials, as is well known, are subject, more or less, to change of form with change of temperature; but in an ordinary way, with ordinary materials, the change is imperceptible when spread equally over the innumerable mortar joints of the materials of construction. But this decided evil in concrete is very much lessened if the cement is not used too fresh, and the work is not hurried. I have found, too, that the time of year during which concrete work is executed has a marked difference in this respect upon the behavior of the walls; if performed during cold weather there is but little after-evidence of contraction or expansion, while if done in hot weather these cracks seem inevitable and irremediable. As to another objection applied to concrete, the difficulties of alterations to existing buildings, arising from the tenacious quality of the constituents, I think, is evidence in its favor, for probably no owners of property would prefer weak walls to strong ones, or, as a simile, would for such a problematical reason select brick walls built in common lime mortar to those built in cement mortar, assuming they had a choice, and the cost of each were identical. Another objection is the difficulty of suitable means for the fixing of joinery and other fittings. Wood bricks can be built in as in brickwork, but are not advisable. Wright's fixing blocks, however, are available, and superior to wood bricks, without any of their shortcomings, and at but very little cost. When a small plug is likely to be required for a single nail, such, for instance, as for narrow architraves, pieces of bell-wire tube two inches in length, filled with sand, can be built in, the sand being afterwards withdrawn and a wood plug inserted. I might mention this as an excellent way of providing means for wiring concrete garden walls for fruit and flower trees.

Concrete walls convey sound, unfortunately, only too well, and the better the concrete the better conductors they become; there appears to be no remedy that I am aware of, except the ordinary and objectionable practice usual with brick walls, such as battening, covering with dry hair-felt, etc. But its greatest defect in the eyes of most people is that it is assumed to be difficult to treat artistically, and no doubt there is much to be said against concrete on this head. Stucco is, as a rule inadmissible now, and it is unfortunate that the introduction of concrete was, for some reasons, fifty years too late, for then the cry of sham had not taken so deep a root as now, and in many cases buildings for which it is admirably suited are built with other materials, because of the inevitable stucco. But concrete can be moulded into almost any shape or size, and dyed to any permanent color, and it is difficult to know why it should not be as much recognized as a facing and ornamental material as terra-cotta, for it has the advantage of the latter insomuch that it can be produced with absolute truth of form, which, with terra-cotta, appears to be out of the question.

The specimens of concrete work produced by Messrs. Lascelles and others are equal in workmanship and appearance to carved stone or cut brickwork, with the advantage of being undamageable by frost and more economical in cost. Rough-cast, pebble-dash, and other surface finishings have been introduced according to individual tastes and fancies, and for buildings in the country are very good methods of finish. Facing slabs of concrete have also been used. Mr. Marsden, an architect of Liverpool, invented a system by which the inside and outside slabs were tied together by iron ties, and the cavity filled with concrete. Mr. Charles Drake introduced a similar system, with the addition of dovetailed grooves cut in them to assist in securing them to the core, and I made some for a special purpose some years since, doing away with the iron ties, and using dovetailed lugs of concrete cast on the slabs themselves. This enabled walls to be built of brickwork externally, with a core of concrete, and facing slabs on the inside. Made in different colors for the inside of the walls, instead of plastering, they have been employed by the architect of the Epsom Town-hall, Royal Albert Dock Hotel, and other structures, Messrs. Lascelles being the builders. It does not appear to be so easy to get any other stain for concrete except a deep red, and for which mineral oxide is a suitable medium. Stains of an earthy character deteriorate the quality of the cement, otherwise almost any variety of tint or shade is possible. I have used bullock's blood instead of water, and obtained an excellent tint and hardness of finished material; but there are obvious objections to its general use. The question has often been raised as to the amount of water necessary for the mixing of concrete, and the general view appears to be that great care should be exercised in not applying too much; but probably too much is better than too little. Without sufficient water homogeneity and perfect cohesion are impossible; whereas if too much is used the cement parts with all or a greater portion not required for setting. In such instances clear water may be found on the surface of the concrete in foundations, and in the case of concrete resting upon boards or centring, the clear water will pass from it through the joints of the boards in considerable quantities.

With regard to the assumed expansion of Portland cement concrete, it is doubtful if any takes place; a continuous floor, one hundred and thirty feet in length, on iron girders, commenced and finished within a fortnight, never affected the end walls enough to disturb their perpendicular position in the smallest degree. The best use for concrete, however, is undoubtedly for floors — best because there is no other material can approach it for facility of execution, strength and economy. At present it may be said that the construction of concrete floors — by which I mean floors carried by iron girders or other means in contra-distinction to concrete laid on the natural ground and designated paving — is almost in the hands of specialists; and although for many reasons better so than if otherwise, it greatly restricts its use for private buildings. The limit of this paper and the importance of this branch of the subject render it impossible to enter upon the question of floor construction; but there are a few general matters in connection therewith worth passing consideration.

An American journal lately reported that a high authority in that country had proved that concrete was not a fire-resisting material;

but we are not told what the concrete referred to was composed of. In point of fact, if the aggregate was of a flinty character, it would under a moderate test, no doubt, go to pieces; but fire-brick, hard-burnt brick, coke, or slag as aggregate, will stand the effects of a conflagration as well as ordinary brickwork. Mr. Hyatt, of Farringdon Street, some years since tested concrete beams in which iron was embedded, and after being some hours in a furnace they were found uninjured; and when tested by means of Holtzapffel's thousandth gauge, it was found that the expansion of both materials was to all intents and purposes the same, and that iron and concrete could be used in combination as a fire-proof material without danger. It has been usually assumed that concrete floors will withstand no vibration and sustain no deflection; but Lieut-Colonel Seddon some years since, whilst conducting some experiments, proved by actual results that this theory is far from being correct; for a concrete slab under severe trial deflected without breaking to such an extent as to tilt up on the outside edges, and leave a cavity between these edges and the walls it rested upon. A number of men also jumped simultaneously upon the same slab, and although causing perceptible vibration, the slab remained perfectly sound, and a beam weighing three hundred and twenty-nine pounds dropped endways from a height of four-and-one-half feet on to the centre of the slab had only the same effect, the concrete remaining uninjured. Mr. Hyatt also found that a beam of concrete, free at all points, bent considerably when exposed to a great heat, but returned to its normal shape when allowed to cool. Much antipathy prevails to a finished surface of cement for concrete floors and pavings of dwellings; and even for agricultural laborers' cottages a strong feeling exists against it. This is accelerated by the cold surface of the cement inducing condensation of watery particles, in damp, changeable weather. Where the surface can be covered with a carpet or cocoanut matting, this objection is of course removed, although wood is more generally preferred. Where circumstances permit, a perfect floor may be formed by covering with or glueing down linoleum to a smooth surface of cement for the centre of rooms, and employing parquetry fastened down with Eberhard's patent glue for the borders. Provision must of course be made for the finished floor surface to be level or flush throughout, and a carpet just to cover the edges of the parquetry all round completes the arrangement. In this case the concrete and cement must be absolutely dry, or the parquetry will burst up, and the linoleum expand or wrinkle, eventually cracking or splitting as the concrete below becomes dry.

For cottage and other common floors ordinary deal battens in narrow widths, and half or three-quarters of an inch in thickness, may be nailed securely and permanently to concrete made with soft bricks or coke, the ordinary sheet floor brads being well adapted to fasten the boards down with. This has been used in a number of laborers' cottages apparently with complete success, and Mr. Hall of Moorgate Street treated some floors in a similar way a year or two since for some modern dwellings in the city; and possibly others may have adopted the principle as an economical system of cheap flooring, possessing very many advantages over ordinary floor joists and thick flooring boards. As in the previous case, the concrete should be thoroughly dry. For pavings of court-yards, basements and similar places concrete is an excellent material laid monolithically, provided there is no probability of periodical upheavings being required to examine contiguous drains; where such a possibility exists then the paving should be of ordinary concrete slabs, such as laid down for footways by the Victoria Stone Company. This paving is an example of what can be accomplished with concrete made with the best materials and under the best conditions. Among the multitudinous articles used in buildings or in connection therewith made of concrete, may be mentioned stairs, sinks, troughs, sills, copings, pier-caps, ridge-tiles and others of a similar character. For rough lintels over door and window openings it ought to quickly supersede wood; for while it is or may be made as strong as York stone, there is practically no deflection and no decay, as with timber, while in case of fire they would help to support the walls; whereas the destruction of wood lintels is oftentimes the cause of their collapse; and in addition the cost of concrete lintels, as far as my experience goes, is always below that of good Baltic fir timber. For water-tanks nothing is so suitable as concrete; it is unyielding in character and economical in cost, and many hill farms and outlying cattle-sheds have of late years been supplied with excellent water collected from slate or tile roofs into concrete tanks, and which formerly depended for their supply upon the runnings from roads drained into clay ponds, and oftentimes little better than sewage. The use of concrete, both at the present time and in the future, involves so many issues, and its application to building purposes is gradually becoming of so varied a character, that I regret limit of time has only permitted me to refer in a very brief manner to some of the more important points in connection with the subject. The various methods of building walls, the appliances in use for the purpose, and the construction of fire-proof and other concrete floors are necessarily left untouched. I have endeavored simply and briefly to call attention to some of the less generally known, but most vital, points in connection with the production of good concrete, also to several matters of detail, and last, but not least in importance, to its faults. Having enumerated some of its good qualities, it is super-essential I should acknowledge not only its short-comings, but candidly avow them, and by calling attention thereto leave to others an opportunity of suggesting or practising means to remedy them.

A BOW-STRING TRUSS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Can you give, or tell me where I can find, information in regard to the following? Want to cover a room 90′ wide with a truss roof; trusses to be placed 20′ apart and to be similar in shape (bow-string) to that in Figure 212, page 419, Kidder's "*Architect's and Builder's Pocket-Book*," but of wood instead of iron as he gives it. Roof will be of corrugated iron. Want to find dimension of members and what rise will be best for upper chord and for lower chord. Have looked through all the authorities on the subject and can find no data for wooden trusses of this form, although I know they are used.

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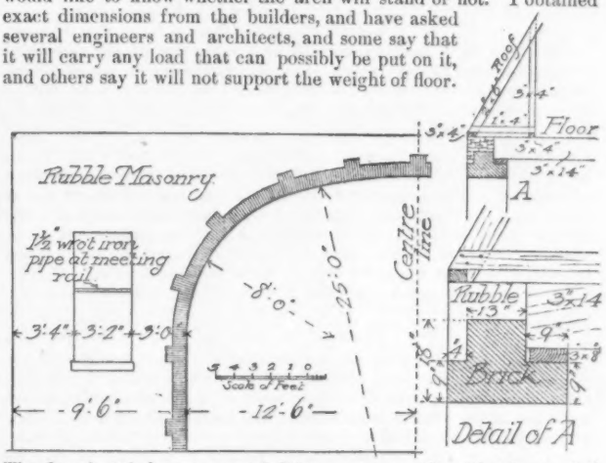
[THE best way would be to design the truss, and calculate the strains from the beginning, or employ some engineer to do so. Unless some truss could be found ready-made, of exactly the dimensions required, it would be unsafe to adapt the sizes of parts from an example nearly similar. The relative rise of the upper and lower chords, for instance, affects very greatly the strains in them. The best construction would be to make the lower chord horizontal, and the rise of the upper chord about one-fourth of the span. If it is necessary to keep the lower chord up in the middle to gain head-room, its size, as well as that of the upper chord, must be very much increased. If "Subscriber" wishes to do all the work of calculation himself, he will find Greene's "*Graphical Statics, Part I*," an excellent guide. — EDS. AMERICAN ARCHITECT.]

STRENGTH OF AN ELLIPTICAL ARCH.

BALTIMORE, MD., April 30, 1885.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — The arch of which I give one-half elevation and section below has been executed in this city. I am a student and would like to know whether the arch will stand or not. I obtained exact dimensions from the builders, and have asked several engineers and architects, and some say that it will carry any load that can possibly be put on it, and others say it will not support the weight of floor.



The floor is 24′ clear span and joists rest on a 3″ x 8″ stringer full length of arch. Roof shingled. Walls built of rubble masonry. Arch of hard brick in cement mortar, built as shown in sketch; outer rim, 9″ x 4″; middle rim, 18″ x 13″; inner rim, on which joists rest, 9″ x 9″. These rims are thoroughly bonded together. The work was done during the cold of last winter. The centres have been struck some three weeks and there are no signs of any cracks anywhere.

Is an elliptical arch of the above dimensions as strong or stronger than a segmental arch with a radius and span of 25′?

Very respectfully yours, C. E. D.

[WE believe the arch would not be safe beyond a question. — EDS. AMERICAN ARCHITECT.]

WHAT MAY PROPERLY BE REQUIRED OF A COMPETING ARCHITECT.

NEW YORK, May 11, 1885.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Two or three years ago you published a letter of mine calling attention to the fact that a commission appointed by the Legislature of Texas to build a new capitol for that commonwealth, and which discretely measured the average ability of laymen to judge of the comparative merits, on technical grounds — whether in relation to construction or æsthetics — of several competitive projects therefor, had called on a prominent architect of this city, Mr. N. Le Brun, to arbitrate on the question. Permit me now a little further use of your valuable columns for the permanent record of another instance of similar praiseworthy modesty and sagacity.

Looking over the "First Annual Report of the Board of Capitol Commissioners of the State of Georgia for the year ending October 4, 1884" — which has recently come into my hands — I find that Mr. George B. Post of this city was asked for and rendered a similar service in their case, the Commissioners "recognizing," as their report says, that their "task was one of great delicacy, requiring a high degree of professional skill and experience."

Mr. Post's observations in the matter are quite calculated to benefit the profession in its relations with the public, inasmuch as they fix attention on the fact that formulated detail cannot be afforded — even if it were necessary, which it is not — and should not be expected in the preliminary rendering of a building project, as to

make the necessary computations for constructional purposes, and the exact specifications required for the guidance and coördination of the various agencies involved, from foundation to dome, in the erection of so important an edifice — and it may properly be added that the rule applies proportionally to any structure, however moderate its grade — "would have required very much greater cash outlay on the part of the competing architect, than the full award agreed to be paid to the successful competitor."

Mr. Post adds: "In my opinion" — and the opinion of an architect of his important and extensive practice can hardly fail to carry great weight — "the premium should be awarded to that plan which in its general features of interior and exterior arrangement and construction, and character of interior and exterior design, most fully meets with the approval of the Board, and its author should be appointed architect for the erection of the Capitol, provided that he can show that he can remodel his plans to meet the views of the Board and the requirements of the State, both in details of arrangement and cost, without either departing from the peculiar features of his plan, or of his interior or exterior design."

Yours truly, A. J. Bloor.

NOTES AND CLIPPINGS.

Bermuda Graves. — Mr. W. A. Croffut says that "all the graves in Bermuda are excavated 8 or 10 feet deep in solid rock. Then the 'founder of a family' is deposited at the bottom, where he belongs, and the other coffins are placed directly upon the top of his till the rocky sepulchre is full. I saw one of these graves, bearing the tender epitaph above it, 'Here lies our father, mother, three brothers and one sister.' Bermuda is the most social place I ever saw."

Collapse of a Large-Sized Sewer. — A case of the above has lately happened in the execution of the Dorking sewerage works, and since, although they are not without precedent, such cases are happily rare, particulars doubtless will be of interest to your readers. The pipes were 21 inches in diameter, and 1 3-4 inches thick (Jennings's make), and were first-class specimens of stoneware pipes. They were laid in a trench 13 feet deep and 4 feet 6 inches wide. The subsoil strata were alluvial, — upper green sand and gault clay; the latter was nobbly and full of water when the trench was excavated, but was got into a good dry condition by means of small agricultural drains laid as subsoil pipes 6 inches below formation level on each side of the trench. The sewer-pipes were laid in the ordinary manner on their barrels, with joint holes for the sockets, which the latter probably touched throughout, but upon which they had no undue bearing. The joints were Stanford's patent (the chipping for which doubtless slightly weakened the pipes), over which a band of clay was worked to prevent leakage. The mode of filling-in after the pipes were laid, carried out in accordance with the specification, was unique. The finest material was selected (sifted, if necessary). It was laid to a height of 2 feet above the highest parts of the first three pipes; other similar material was then thrown upon that and carefully pushed along on to the next pipe, and so on, no ramming whatever being permitted until this fine, soft filling material was 2 feet above the highest parts of the pipes. The remainder was then thrown in and rammed, there being two rammers specified to one filler. The pipes being thus without lateral support (for the loose filling could have been of no possible use in this respect), and practically arches without abutments, it is scarcely surprising that every pipe collapsed as far as the ground had been filled in. The ramming applied to the last 9 feet of filling consolidated it into one mass, 4 feet 6 inches wide, which settled bodily. There were 4 feet of soft unrammed filling at the sides of the pipes, and only 2 feet on top of them, so that when the mass subsiding had compressed the soft filling on the top of the pipe to its greatest density, the filling at the side was only half compressed; consequently, 13,000 pounds of earth ultimately settled upon each pipe, whose crushing strength was not equal to one-half that weight. — *Ignoramus, in The Builder.*

The Western Union's Pneumatic Tubes. — The system of dispatching messages to comparatively long distances through pneumatic tubes has been operated by the Western Union Telegraph Company for about four months, and its perfect success is assured. It is intended to make this system the centre of an intricate pneumatic railway which shall connect every Western Union office in the city. Specifications have already been made to complete this ingenious purpose, which will be carried through with all convenient speed. The general scheme of transmitting messages through a tube by means of air pressure is not new, and has been for years successfully practised between the Dey Street office of the company and the newspaper offices. But the particular methods embraced in this new system have many original features. A trench from four to six feet beneath the surface of the street connects the Western Union office at Broadway and Dey Street with their up-town office at Fifth Avenue and Twenty-third Street. This site was formerly occupied by the old brown-stone mansion long known as the Peckham homestead. It was bought by the company a little over two years ago, and is intended for a distribution office for a large territory above Fourteenth Street. Work began upon the trench which runs through Broadway about eighteen months ago, during the strike of the telegraph employés. The trench contains six tubes. Four are of brass, four inches in diameter. Two are of iron about six inches in diameter. The brass tubes are designed for the pneumatic service. Two run without interruption from the operators' room in the top floor of the Dey-Street building to the basement of the Twenty-third-Street office. The other two are used for conveying messages to intermediate offices. The iron tubes are filled with telegraph wires already laid but not connected, to be used in cases of extraordinary business pressure. For transmission the messages are put into a leather box, cylindrical in shape, which fits the tube easily, capped at each joint with flanges that make it air-tight. In the basement of each building there are four engines of 250 horse-power each. These eight engines work the tubes, one in each building being connected with each tube. When the box of messages is slipped into the tube, one engine exhausts the air in the pipe before it and the other pumps air into the pipe behind it, and the box whizzes through at the rate of a mile a minute. About fifty separate messages are sent with every box, though it will hold one hundred. The tube is laid in sections of twenty feet, and elongations and contractions of the metal by changes of temperature are carefully provided for. In some places the closeness of the New York Steam Heating Company's pipes has made this allowance especially necessary. A small joint is inserted at points which will admit of an expansion in every 800 feet of pipe of two inches. Some time ago one of the steam pipes sprung a leak and the brass tubes became so hot that they could not be handled. This incident caused the greatest expansion yet observed, which was an inch and three-quarters in the 800 feet of tubing. The tubes, if worked to their greatest capacity, can transmit ten boxes or a thousand messages, each minute. Packages may be sent as well as paper messages, or anything else that can be got into the box. The direct tubes will not admit of any stoppages short of the terminal stations, but if messages are designed for way stations that are connected with the other two tubes, the operator at the dispatching office informs the operator at the receiving office by an electric bell. The receiving operator swings the section of the tube above him to one side, thus breaking the connection. He replaces it with a glass face to stop the suction, and a wire screen to stop the box at its end. His station is connected by a curved tube that comes up out of the street, and by the time he has completed these changes the box is before him and he reopens the tube. This system of reversible stop-covers that catch the boxes up just at the right station is something new in mechanical achievement. Air-tight collars protect the points where the sections of the tubing join. At distances of about 400 feet a man-hole is sunk into the trench and workmen may descend and make such repairs as are needed from time to time. Injuries to the pipe which impair its operation may be placed by passing a box through it connected with a rope at each end. In connecting the terminal station, which cost something more than one hundred thousand dollars, 76,400 feet of tubing is used. The cost of the engines, air-pumps and compressors is about as much more. The pressure of air in the compressed tank is thirty pounds to the square inch, and the perfection of the machinery has been shown by an experiment which proves the exhaust to be twenty-eight and one-half inches, almost an actual vacuum. — *New York Tribune.*

Incendiary Steam-Pipes. — The *Iron Age* takes this conservative position as to the possibility of hot steam-pipes setting fire to a building: "A great deal of misinformation exists concerning the danger arising from the careless disposition of steam-pipes. It is often asserted that fires are caused by the steam-pipes, used to convey the steam for heating a building, coming in contact with wood or other combustible bodies. The fact is that while there is much danger from improperly protected steam-pipes, due to the charring of the adjacent wood, it may well be doubted if the temperature of the pipe in ordinary circumstances can ever rise sufficiently high to set fire to the wood, whether charred or uncharred. The pressure of the steam employed for heating is usually below 60 pounds, and may safely be said to never rise above 100 pounds, per square inch. At this higher pressure the temperature of the steam is but 338° F., which is insufficient to produce actual combustion under ordinary conditions. We think this sufficiently proves that steam-pipes can never be the immediate cause of fires, but we would not have our readers understand that there is any the less danger in their careless arrangement. A case is reported by the daily press of this city, where a fire occurred in a private residence, and, after being extinguished, it was discovered that the woodwork between the partitions where the steam-pipes ran was scorched, which, taken together with the fact that the fire originated in the partition-wall, appeared to our contemporary conclusive evidence that it was caused by the heated pipes igniting the wood. Though not of a temperature sufficiently high to cause flame, the pipes had undoubtedly charred the wood in immediate contact, besides drying and heating all the surrounding materials. With such a condition of things, the smallest spark will start a fire which, except for the inflammable state of the wood-work, would have otherwise proved harmless. It is this indirect danger, which practically is of as much moment as an immediate one, that makes the question of steam-pipe laying of so much importance, for with charred wood and tinder-like particles of dust freely distributed throughout a building the precautions followed in a gunpowder factory are none too severe if absolute safety would be assured."

Straightening a Mill Chimney. — It was discovered on examination not long ago, says a contemporary, that a chimney 80 feet high, at a machine shop at Holyoke, Mass., was about 42 inches out of perpendicular. The method employed in righting was quite simple. A harness was located under the cornice, and two others below the first. Two lever jackscrews were placed under the girders of one of the harnesses on one side, and six jackscrews similarly on the other side. The earth was then carefully loosened about the chimney on the opposite side from that of its inclination and water poured in, after which the jackscrews were turned gradually, and the earth again loosened and dampened with the hose. After this process had been several times repeated the earth was puddled, and the whole stands now properly righted.

An Important Insurance Decision. — Judge Holmes, of the Supreme Court of Massachusetts, rules that in case of fire "the insured is not bound to give a detailed statement of his loss; that the insurance companies must ascertain the amount as they can and pay, or else they must stand suit. The plaintiff's right to sue is not dependent on having sent to the insurance companies a detailed statement of the loss which he has suffered." — *New York Evening Post.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

317,025. APPARATUS FOR FLUSHING SEWERS, WATER-PIPES, ETC.—James Scott, Denver, Col.

317,036. TRANSOM-LIFTER. — Chas. E. Steller, Milwaukee, Wis.

317,043. SINK-VALVE,—Charles M. Tack, St. Louis, Mo.

317,051. SASH-FASTENER. — James Walsh, North Adams, Mass.

317,053. ARCHITECTURAL COLUMN. — George J. Weber, Boonville, Mo.

317,055. SUPPLY-VALVE FOR THE FLUSHING-TANKS OF WATER-CLOSETS, ETC.—Henry C. Weeden, Boston, Mass.

317,072. SUPPORT FOR CENTRES FOR MASONRY ARCHES.—C. H. Ackerson, San Francisco, Cal.

317,076. LOCK.—Albert L. Becht, Paris, France.

317,077. MOSAIC OF GLASS AND LEAD GLAZING.—Henry F. Belcher, Irvington, N. J.

317,092. PLANE. — George A. Clifford, Peabody, Mass.

317,099. TRAP FOR SEWERS.—John Demarest, New York, N. Y.

317,101. APPARATUS FOR FORMING MOULDS FOR CASTING METAL PIPE. — Jacob K. Dimmick, Newport, Ky.

317,107. ARTIFICIAL FACING-BLOCK FOR BUILDINGS.—Henry G. Fiske, San Francisco, Cal.

317,121. SASH-HOLDER. —Geo. A. Grenville, Kingsville, Ont.

317,125. WOOD-FILLER.—Henry Hales, Ridgewood, N. J.

317,129. PROCESS OF PRESERVING WOOD.—Ludvig Hansen and Andrew Smith, Wilmington, N. C.

317,132. SPRING FOR DOORS AND GATES.—Nimrod Headington and Jesse S. Malin, Portland, Ind.

317,147. DOOR-CHECK. — Jacob Krumscheid, Boston, Mass.

317,170. BOLT.—William F. Morgan, Collingwood, Ontario, Can.

317,176. METALLIC PLATE FOR COVERING ROOFS AND WALLS. — Gottfried A. Niebeling, Remscheid, Prussia, Germany.

317,187. BIT-STOCK. — Johannes Th. Pedersen, Brooklyn, N. Y.

317,233. WOODEN TONGUE FOR JOINING FLOORING, ETC.—Irwin H. Spelman, Cortland, O.

317,238. WINDOW-SHADE AND AWNING.—David R. Stedman, Elizabeth, N. J.

317,250. LEVEL.—James Walsh, Thomas F. Murphy and Everett A. Clark, North Adams, Mass.

317,262. SASH-BALANCE. — Wm. F. Winship, Albany, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Since our last report thirty-one permits have been granted, the more important of which are the following:—

G. W. Parke, 9 three-st'y brick buildings, commencing s e cor. Charles St. and Fort Ave.

J. T. King, three-st'y brick building, e s Valley St., between Chase and Biddle Sts.

John T. Gray, three-st'y brick building, s e cor. Broadway and Milliman Sts.

Louis Buckner, three-st'y brick building, n w cor. Harrison and Fayette Sts.

John M. Getz, 5 three-st'y brick buildings, s s Biddle St., commencing s w cor. Ensor St.

H. C. Barnes, 16 two-st'y brick buildings, s s Nanticoke St., s w from Cross St.

Thos. O. Hittoffer, 5 three-st'y brick buildings, e s Fulton Ave., n of Patterson Ave.

W. Hildebrand, three-st'y brick building, s s Preston St., between Ensor St. and Holland Alley.

Western Maryland Church, stone church, s w cor. Gilmor St. and Lafayette Ave.

John Schultz, three-st'y brick building, n s Chestnut Alley, between Fremont and Brune Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *East Third St., Nos.* 823, 825, 827 *and* 829, 4 dwells., 19′ x 40′; James Collins, owner; Michael Nolan, builder.

Shawmut Ave., No. 459, printing-office, 20′ x 40′; Freewill Baptist Print Estate, owner; Woodbury & Leighton, builders.

West Broadway, No. 131, dwell. and store, 25′ x 60′; Ellen Sullivan, owner; P. F. Hanlon, builder.

Columbus Ave., No. 249, tenement, 38′ x 67′ 8″; Jas. S. Stone, owner; G. W. Pope, builder.

South Russell St., No. 20, dwell., 21′ 8″ x 40′; E. T. Polliz, owner; J. H. Stevenson, builder.

Winship St., near Washington St., school-house, 67′ 6″ x 27′ and 104′ 8″ City of Boston, owner; Michael Nolan, builder.

Brooklyn.

BUILDING PERMITS. — *Ten Eyck St., No.* 37, n s, 150′ w Leonard St., four-st'y frame tenement, (brick-filled), tin roof; cost, $7,000; owner, Chas. Zellhoefer, 175 South Fourth St.; architect, E. F. Gaylor; builders, Jenkins & Gillies and George Lehrian & Sons.

Manhattan Ave., e s, 145′ s Norman Ave., four-st'y frame store and extension (brick-filled), gravel roof; cost, $6,700; owner, Bridget O'Hare, 145 Green St.; architect, F. Weber; builders, Post & Walker and J. Cashman.

De Kalb Ave., w s, near Hamburgh St., three-st'y frame tenement (brick-filled), tin roof; cost, $4,500; owner, W. R. Ostrander, 209 Keap St.; architect, J. Ireland; mason, Wm. Mead.

St. James Pl., w s, 30′ n Atlantic Ave., 3 three-st'y brick stone-front dwells., tin roofs; cost, each, $6,500; owner, William Moses; architect, A. Hill; builder, J. Stafford.

McDonough St., s s, 162′ 6″ e Tompkins Ave., 4 three-st'y brick and brown-stone dwells., tin roofs; cost, each, $7,000; owner, John Frasier, 16 Rochester Ave.

Manhattan Ave., No. 585, w s, 50′ s Box St., three-st'y frame car-house, etc., gravel roof; cost, $3,500; owner, Cross Town R. R. Co., 585 Manhattan Ave.; architect and contractor, A. L. Chase; builder, G. Strepes.

Seventh Ave., n e cor. Nineteenth St., three-st'y frame tenement, tin roof; cost, $3,500; owner, Owen O'Brien, 874 Sixth Ave., New York; architect, F. Ryan; mason, T. Ryan.

Ten Eyck St., Nos. 24 *and* 26, 2 three-st'y frame (brick-filled) dwells., tin roofs; cost, each, $3,500; owners, A. & C. Bruuger, 16 Ten Eyck St.; builders, C. L. Johnson's Sons.

Columbia St., No. 51, 100′ s Amity St., five-st'y brick double tenement, tin roof, metal cornice; cost, $16,000; owner, Mrs. B. Kane, on premises; architects, Parfitt Bros.

Throop Ave., n w cor. Lexington Ave., three-st'y brick store and flats, tin roofs, wooden cornices; cost, $7,000; owner and builder, John McDikken, 282 Marion St.; architect, Ernest Dennis.

Jefferson St., 180′ e Tompkins Ave., 5 three-st'y brown-stone dwells., tin roofs; cost, each, $6,000; owner, S. C. Phillips, 691 Lafayette Ave.; architect, A. Hill.

Madison St., n s, 80′ e Bedford Ave., two-and-a-half-st'y dwell., tin roof; cost, $5,500; owner, John B. Grube, 133 Madison St.; architect, A. Hill.

Humboldt St., e s, 72′ s Meserole St., four-st'y brick tenement, tin roof; cost, $7,000; owner, Theo. Klingelhoefer, Grand and Eighth Sts.; architect, J. Platte; builder, G. Lehrian.

Stockton St., s s, 470′ e Nostrand Ave., 2 frame buildings (brick-filled) one store and tenement, and one tenement, tin roof; cost, each, $4,500; owners and builders, Henry and John Eich, 762 Park Ave.; architect, Th. Engelhardt.

Linden St., s s, 100′ e Bushwick Ave., two-st'y frame dwell., shingle roof; cost, $4,000; owner, A. R. Black, office Brooklyn *Daily Times;* contractor, John C. Sawkins.

Putnam Ave., n s, 255′ e Tompkins Ave., 2 three-st'y brown-stone dwells., tin roofs; cost, each, $8,000; owners, Buckley & Hornby, 890 Gates Ave.; architect, O. Burhaus; builder, W. Wood.

Adelphi St., w s, about 200′ s De Kalb Ave., two-st'y sandstone chapel and Sunday-school, peak slate roof; cost, $11,000; owner, St. Marks Church, Adelphi St.; architect, L. B. Valk; builders, T. Thatcher and E. S. Boyd & Son.

Lafayette Ave., s s, 100′ e Throop Ave., 5 two-st'y brick dwells., tin roofs, wooden cornices; cost, each, $3,000; owner, etc., John K. Bulmer, 213 Adelphi St.

Bedford Ave., w s, 87′ 6″ s Myrtle Ave., two-st'y brick office and salesroom, tin roof; cost, about $6,000; owner, Edwin C. Swift, Lowell, Mass.; architect, J. O'Rourke; builder, B. F. Bailey.

Degraw St., n s, 300′ w Columbia St., 2 four-st'y brick tenements, tin roofs; cost, each, $6,750; owner, John Edwards, 31 First Pl.; architect, Mercein Thomas; builders, Abraham Rutan and Morris & Selover.

Greene Ave., n s, 300′ w Nostrand Ave., 5 four-st'y brown-stone dwells., tin roofs; cost, each, $8,000; owner, William J. Rider, 128 Quincy St.; architect, Amzi Hill.

Herkimer St., n s, 200′ e Howard Ave., 6 two-st'y brick dwells., frame and gravel roofs; cost, each, $3,400; owner and architect, Benj. T. Robbins, Northport, L. I.; builder, E. K. Robbins.

ALTERATIONS.—*Fulton St.*, n w cor. Bedford Ave., add one-st'y, gravel roof; cost, $7,000; owner, Archibald Scott, 186 Flushing Ave.; architect, A. Hill; builders, A. Rutan and Lang & Barnes.

Broadway, Nos. 18, 20 *and* 22, alteration to flat, fronts rebuilt; cost, $12,000; owners, S. Liebmann's Sons, Forrest Ave., near Bremen St.; architect, E. F. Gaylor; builders, Geo. Lehrian & Son and Marinus & Gill.

Chicago.

BUILDING PERMITS:—H. E. Leimbach, two-st'y dwell., 653 Fullerton Ave.; cost, $4,000.

H. Larsen, three-st'y dwell., 223 West Ohio St.; cost, $3,500.

A. Hansen, three-st'y dwell., 95 Centre Ave.; cost, $3,500.

G. Fraja, two-st'y store and dwell., 401 Wells St.; cost, $2,500.

Crane Bros., three-st'y factory, Jefferson St.; cost, $50,000; architect, W. W. Boyington; builders, W. Wills & Son.

S. L. Frazer, two-st'y dwell., 3240 Rhodes Ave.; cost, $5,000; architects, Wheelock & Clay.

J. Seuft, three-st'y store and dwell., 806 Allport Ave.; cost, $3,000; architects, Benes & Sayer.

F. Marrel, three-st'y store and dwell., 845 Ashland St.; cost, $5,000; architects, Benes & Sayer.

R. Knisely, two-st'y shop, 184 South Jefferson St.; cost, $3,000.

E. A. Burdett, three-st'y dwell., 51 Bellevue Pl.; cost, $18,000; architects, Burnham & Root.

C. H. Wells, three-st'y store and flats, Sedgwick and Centre Sts.; cost, $40,000; architect, H. Zirk.

F. Kamentz, three-st'y store and dwell., 943 North Halsted St.; cost, $4,000.

Wm. Maeller, two-st'y dwell., 3112 to 3114 Calumet Ave.; cost, $10,000; architects, Furst & Rudolph.

F. Heeiling, two-st'y dwell., 2724 Farrell St.; cost, $2,500.

C. M. Foy, three-st'y dwell., 43 Bellevue Pl.; cost, $10,000; architects, Cobb & Frost.

H. Hardin, three-st'y flats, 448 Thirty-first St.; cost, $8,000; architect, C. Cobb; builder, D. McLachlan.

A. L. Petterson, three-st'y store and flats, 935 West Madison St.; cost, $6,000; architect, W. Pashley; builder, J. Keating.

A. Kolt, three-st'y flats, 343 State St.; cost, $2,500.

Rialto Building, nine-st'y office building, Van Buren and Sherman Sts.; cost, $500,000; architects, Burnham & Root; builders, Mortimer & Tupper.

A. J. Kowslaski, four-st'y store and flats, 615 Noble St.; cost, $9,000; architect, H. Kley.

P. H. Hoffman, three-st'y dwell., 159 West Ohio St.; cost, $4,000.

Mrs. M. Henne, three-st'y store and dwells., 387 to 391 Wells St.; cost, $14,000.

Dr. Byford, 4 two-st'y dwells., 3235 to 3241 South Park Ave.; cost, $15,000; architect, W. A. Thurber.

H. Schaller, two-st'y dwell., 695 to 697 Fullerton Ave.; cost, $6,000.

Mrs. A. Kaiser, two-st'y store and dwell., 84 Thirteenth St.; cost, $4,000.

Blake and Rezabek, two-st'y store and dwell., 598 West Eighteenth St.; cost, $5,000.

F. Enert, three-st'y store and flats, 3108 Halsted St.; cost, $4,000.

Eckhardt & Swan, four st'y warehouse, Canal and Fulton Sts.; cost, $3,200.

Mrs. M. R. Lairg, two-st'y flats, 3230 Forest Ave.; cost, $8,200.

A. Haaker, addition, 230 Division St.; cost, $2,500.

B. Moeck, three-st'y store and dwell., 3000 State St.; cost, $12,000; architect, J. Huber.

N. Johnson, two-st'y dwell., 509 Armitage St.; cost, $2,600.

Board of Education, three-st'y school-house, Wallace and Thirty-first Sts.; cost, $49,000; architect, J. J. Flanders; builder, Wm. M. Crilly.

Board of Education, three-st'y school-house, Nineteenth Pl. and Ashland Ave.; cost, $49,000; architect, J. J. Flanders; builder, Wm. M. Crilly.

Board of Education, three-st'y school-house, Thirteenth Pl., near Hoyne Ave.; cost, $49,000; architect, J. J. Flanders; builder, Wm. M. Crilly.

A. Keep, two-st'y barn, Michigan Ave.; cost, $3,500.

J. J. Hallock, two-st'y dwell., 525 Hurlbut St.; cost, $4,500; architect, J. J. Hallock.

Cincinnati.

GYMNASIUM.— The Cincinnati Gymnasium has leased the upper part of the Grand Opera House Building, owned by Mr. David Sinton, and will at once commence operations to make first-class rooms for their purposes. The space to be occupied is 73′ x 78′, and 48′ high; cost, about $15,000; Charles Crapsey, architect.

BUILDING PERMITS.— Mrs. Kruthaup, 2 three-st'y brick buildings, Cutter St., bet. Third and Pearl Sts.; cost, $9,000.

P. Tracy, four-st'y brick building, n e cor. Central Ave.; cost, $8,000.

A. Bauer, three-st'y brick building, Harrison Ave.; cost, $6,000.

Miss Renner, two-and-one-half-st'y brick building, 151 Pleasant St.; cost, $3,000.

Geo. Gould, addition, three-st'y brick building, 232 John St.; cost, $4,000.

Standard Wagon Company, two-st'y brick building, n s Eighth St.; cost, $5,000.

J. Freiberg, three-st'y brick building, n s Ninth St., bet. Baymillar and Freeman Sts.; cost, $7,000.

E. Furst, three-and-one-half-st'y brick building, 55 Clinton St., cost, $6,500.

Theo. Reager, three-st'y brick building, York St.; cost, $3,000.

Mrs. E. H. Ross, two-and-one-half-st'y brick building, w s Beecher St., bet. Lane and Gilbert Sts.; cost, $7,000.

Louis Metz, three-st'y brick building, n s Charles St., bet. Elm and Plum Sts.; repairs and addition costing $4,000.

Total number of permits to date, 302.

Total cost to date, $1,046,500.

Kansas City, Mo.

The stonemasons have met and effected a permanent organization. The object of the organization is simply for mutual protection.

BUILDING PERMITS.— W. A. Kelly, three-and-one-half-st'y brick business block, 507 Walnut St.; cost, $8,000.

Langston Bacon, two brick houses, Holmes St.; cost, $3,000.

W. H. Plum, brick business block, Grand Ave.; cost, $3,500.

G. D. Huling, brick block, 800 Delaware St.; cost, $4,500.

W. C. Lobenstein, brick business block, 561 to 563 Main St.; cost, $30,000.

J. C. Nettleton, block of six brick houses, 912 to 922 East Sixteenth St.; cost, $10,000.

K. S. Rogers, four frame houses, Jefferson St.; cost, $5,000.

Charles Van Evam, brick and stone barn, East Twelfth St.; cost, $7,000.

J. B. Ghio, brick business block, St. Louis Ave.; cost, $6,000.

R. T. Hunt, 6 two-and-one-half-st'y houses; cost, $15,000.

W. M. Masters, brick business block, East Eighteenth St.; cost, $4,500.

T. O. Combs, frame business block, cor. Seventeenth St. and Madison Ave.; cost, $3,000.

R. J. Johnson, frame house, cor. Fifth St. and Lydia Ave.; cost, $3,000.

M. Schoonmaker, brick house, 1723 Jefferson St.; cost $5,000.

Sam W. Gregory, brick house, 1011 Forest Ave.; cost, $5,000.

Seth Mabry, 6 three-st'y brick houses, each 50′ x 58′, cor. Tenth and Central Sts.; cost, $30,000.

J. I. Raynolds, two houses, Penn St.; cost, $2,500.

Cornelius Murphy, brick house, 1103 Cherry St.; cost $3,000.

C. I. Kimmel, house, 1301 Forest Ave.; cost, $5,000.

J. W. Trueworthy, brick house, 1342 East Ninth St.; cost, $5,000.

W. C. Campbell, brick business block, cor. Twelfth and Harrison Sts.; cost, $5,000.

Elmer W. Hines, brick house, Tracy Ave.; cost, $3,000.

Jacob Kirtzman, brick house, 560 Harrison St.; cost, $3,300.

Dr. James B. Bell, two-st'y brick business and residence block, cor. Twelfth and Locust Sts., 132′ x 155; cost, $25,000.

Minneapolis, Minn.

Building Permits.—J. M. Griffith, two-st'y brick store building, w s Second St., bet. Seventh and Eighth Aves.; cost, $3,000.

Zach T. Mullen, two-st'y wooden dwell. and barn, n s Oak Grove St., bet. Hennepin Ave. and Spruce St., s; cost, $8,000.

Board of Education, cor. Fourteenth St. s and Spruce Pl., three-st'y brick school building; cost, $25,000.

Board of Education, cor. Oak and B Sts., s e, three-st'y brick school building; cost, $25,000.

H. D. Pettibone, two-st'y brick veneer dwell., cor. Seventh St. and Thirteenth Ave., s; cost, $3,500.

George R. Layman, brick store building, n e s Fifth St., bet. Nicolet and First Ave., s; cost, $5,000.

George R. Layman, two-st'y wooden dwell., e s Seven-and-a-half Ave., bet. East Eighteenth and East Nineteenth Sts.; cost, $4,500.

David Tica, two-st'y wooden stores, Western Ave., bet. Twelfth and Thirteenth Sts., n; cost, $4,500.

Hennepin County, repairing court-house, s cor. Eighth Ave. and Fourth St., s; cost, $6,500.

M. T. Tobin, two-st'y brick veneer dwell., e s Eleventh Ave.; cost, $3,000.

H. R. Conary, two-st'y wooden dwells., w s Stevens Ave., bet. East Twenty-eighth and East Twenty-ninth Sts.; cost, $3,000.

W. H. Haight, two wooden dwells., w s Fifth Ave., bet. East Twenty-fourth and East Twenty-fifth Sts.; cost, $3,500.

Mrs. M. J. Bell, two-st'y wooden dwell., w s Chicago Ave., bet. Ninth and Tenth Sts., s; cost, $3,000.

Charles A. Bovey, double two-st'y wooden dwell. and alteration of wooden barn, n s Harmon Pl., bet. Twelfth and Thirteenth Sts., n; cost, $8,250.

Lyman Bros., two-st'y brick addition to building, 421 Nicollet Ave.; cost, $3,500.

Union Elevator Company, wooden grain elevator, n e s St. Paul, Minneapolis & Manitoba Railway track; in sec. 19, town 29, range 23; cost, $250,000.

L. M. Lane, two-st'y wooden dwell. and barn, s w s Sixth St., bet. Second and Third Aves., s; cost, $3,700.

L. M. Lane, double two-st'y wooden dwell. and barn, s w s Sixth St., bet. Second and Third Aves., s; cost, $4,000.

Philadelphia.

Building Permits.—*Twenty-fourth St.*, n of Brown St., 20 three-st'y dwells., 17′ x 58′ 6″; Jno. M. Sharp, owner.

Twenty-fourth St., n of Brown St., 8 three-st'y dwells., 20′ x 55′; owner, same as last.

Ringgold St., s of Parrish St., 9 two-st'y dwells., 16′ x 40′; owner, same as last.

Goodman St., below Westmoreland St., two-st'y dwell., 16′ x 44′; Jos. Smith, owner.

Catharine St., w of Broad St., three-st'y dwell., 18′ x 62′; Thos. Little, contractor.

Seventeenth St., s of Master St., three-st'y store, 18′ 6″ x 60′; P. H. Somersett, contractor.

Kirkbride St., cor. Richmond St., two-st'y store, 18′ x 60′; Amos W. Linn.

Manton St., w of Twenty-first St., 9 two-st'y dwells., 14′ x 35′; Jno. McConaghy, owner.

Hancock St., n of Lehigh Ave., two-st'y dwell., 17′ x 43′; Chas. Booth, contractor.

Hancock St., n of Lehigh Ave., two-st'y office, 18′ x 56′; contractor, same as last.

York Road, three-st'y dwell., 29′ x 38′; W. R. Brown.

York Road, two-st'y stable, 22′ x 32′; W. R. Brown.

Wharton St., cor. Ward St., one-st'y shop, 18′ x 40′; D. McGettigan, owner.

Wharton St., Nos. 3224 *and* 3226, 2 two-st'y dwells., 16′ x 28′; Thompson Bros., contractors.

Passayunk Ave., w of Schuylkill Ave., two-st'y machine-shop, 50′ x 120′; also, one-st'y boiler-house, 57′ x 120′; owner, Atlantic Refining Co.

Twenty-fifth St., above Brown St., 19 two-st'y dwells., 16′ x 57′; I. H. Lyons, owner.

Twenty-fifth St., above Brown St., 10 three-st'y dwells., 18′ x 57′; I. H. Lyons, owner.

Page St., above Twenty-ninth St., 8 two-st'y dwells., 13′ x 36′; W. H. Thompson, owner.

Berks St., above Twenty-first St., 8 two-st'y dwells., 15′ x 44′; J. L. Carre, owner.

Main St., between Chestnut and Summit St., two-st'y dwell., 26′ x 27′; G. S. Pott, owner.

West Johnson St., No. 45, three-st'y dwell., 45′ x 70′; C. R. Kohl & Bros., contractors.

Manheim St., w of Twenty-first St., 10 two-st'y dwells., 14′ x 35′; Jno. McConaghy, contractor.

New York.

The New Building Laws.—The new building laws do not appear to give universal satisfaction, and some action will be taken to prevent them being signed by Governor Hill.

Association Building.—For the Young Women's Christian Association, a five-and-a-half-st'y brick and stone building, 75′ x 102′, is to be built on the n s of Fifteenth St., 100′ e of Fifth Ave., from plans of Mr. R. H. Robertson, to cost $90,000.

Club-House.—At Nos. 60 and 62 Pine St., and Nos. 22 and 24 Cedar St., a five-st'y club-house, 44′ x 134′, is to be built for the Down-Town Association from plans of Mr. C. C. Haight.

Contracts.—A large number of contracts have lately been signed for buildings previously reported; the labor question having been settled, figures are pretty close.

Factory.—The United States Illuminating Company will build a factory on a lot, 100′ x 125′, at the foot of Twenty-ninth St. and East River.

Building Permits.—*West Fourth St., No.* 151, six-st'y brick tenement, tin roof; cost, $15,000; owner, Walden Pell, 10 East Thirtieth St.; builder, C. E. Hadden.

Franklin St., s e cor. West St., 6 two-st'y brick stores, four on Franklin St. and two on West St.; total cost, $20,000; attorney for owner, Fred. Clarkson, 54 Wall St.; architect, Daniel Burgess; builders, D. & E. Herbert and Egbert Mills.

Tremont Ave., n s, 25′ e Daly Ave., two-st'y brick engine-house (No. 45), shingle roof; cost, $10,000; owner, City of New York Fire Department, 155 Mercer St.; architects, N. Le Brun & Son.

Charles St., s s, 75′ w Washington St., seven-st'y brick, fire-proof malt-house, asphalt roof; cost, $48,000; owners, Beadleston & Woerz, 291 West One Hundredth St.; architects, A. Pfund & Son.

Tenth St., n s, 10s′ w Washington St., seven-st'y brick, fire-proof storage-building, asphalt roof; cost, $10,000; owner and architect, same as last.

Stanton St., No. 242, five-st'y brown-stone front tenement, tin roof; cost, $18,000; owner, Michael Fay, 416 East One Hundred and Twentieth St.; architects, A. B. Ogden & Son.

Stanton St., No. 249, five-st'y brown-stone front tenement; cost, $16,000; owner and architect, same as last.

Suffolk St., e s, 100′ s Stanton St., 4 five-st'y brick tenements and stores, tin roofs; cost, $20,000 each; owner, etc., J. P. Murray, 315 East One Hundred and Sixteenth St., and Chas. Ruff, 18 Hester St.; architect, J. H. Valentine.

Wall St., Nos. 8, 10 *and* 12, and *Pine St., Nos.* 7 *and* 9, eight-st'y and attic brick fire-proof office-building, slate and asphalt roof; cost, $500,000; owner represented by J. J. Astor, 388 Fifth Ave.; architect, H. J. Hardenbergh.

Delancey St., Nos. 240, 242, 244 *and* 246, 4 five-st'y brick tenements, tin roofs; cost, total, $64,000; owner, S. Langfelder, 85 East Broadway; architect, Chas. Rentz.

Grand St., No. 74, five-st'y brick store, tin roof; cost, $30,000; owner, Ambrose Kingsland, 55 Broad St.; architect, Geo. W. da Cunha.

Madison St., n s, 100′ e Catharine St., five-st'y brick tenement, tin roof; cost, $12,0000; owner, Mary J. Lancer, 51 Oak St.; architect, Ernest Dennis; builder, John G. Porter.

Eleventh Ave., No. 426, five-st'y brick tenement, tin roof; cost, $18,000; owner, Thos. Muller, Flushing, L. I.; architect, C. F. Ridder.

St. Louis.

Building Permits.—Sixty-six permits have been issued since our last report, sixteen of which are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows:—

St. Louis Mutual House-Building Co., No. 3, two-st'y brick dwell.; cost, $3,000; E. Mortimer, architect; J. H. Dunlap, contractor.

George Heerich, two-st'y brick dwell.; cost, $5,600; Guunewald & Wind, contractors.

Joseph Dormitzer, 3 adjacent one-st'y stores; cost, $3,000; F. C. Bonsack, contractor.

G. Kingsland estate, one-st'y brick store; cost, $4,500; Pombiray, architect; S. Robbins, contractor.

Mrs. Sair, 5 adjacent two-st'y brick dwells.; cost, $9,500; A. Garble & Co., architects; A. E. Cook, contractor.

Jno. J. Thompson, two-st'y brick dwell.; cost, $2,500; Jno. S. Thomas, contractor.

Dr. S. C. Cabanne, two-st'y brick dwell.; cost, $6,000; J. Cudmore & Bro., contractors.

F. B. Hauck, four-st'y brick store; cost, $15,000; H. E. Peipers, architect; contract sub-let.

Wm. H. Young, two-st'y brick dwell.; cost, $2,500; Pritchett & Moore, contractors.

M. D. Thompson, three-st'y store and offices; cost, $3,000; J. P. Evans, contractor.

Chas. Timmerberg, 2 adjacent two-st'y brick stores and tenements; cost, $6,000; A. Beinke & Co., architects; R. J. Loyd, contractor.

Green Tree Brewery Co., three-st'y brick brewery and malt house; cost, $20,000; J. Jungenfeld & Co., architects; contract sub-let.

Jno Quast, two-st'y brick dwell.; cost, $3,800; H. Ellermann, contractor.

St. Paul.

Building Permits.—Two-st'y frame dwell., n s of Laurel Ave., bet. Western and Arundel Sts.; cost, $4,600; owner, C. W. Kibby.

Three-st'y brick veneer stores and dwells., w s of Mississippi St., bet. Glencoe and Mississippi Sts.; cost, $8,500; owner, John Kreener.

Two-st'y brick double dwell., e s of Minnesota St., bet. Tenth and Eleventh Sts.; cost, $6,000; owner, Christopher Ritcher.

Two-st'y frame dwell., w s of Josette St., bet. Nelson and Iglehart Sts.; cost, $2,450; owner, Mrs. E. J. Mott.

Two-st'y brick veneer store and dwell., s w s of Wabasha St., bet. Aurora and University Sts.; cost, $3,600; owner, W. Achterling.

Two-st'y frame double store and dwell., s s of Seventh St., bet. Arcade and Minnehaha Sts.; cost, $2,400; owner, J. G. Elinquist.

2 two-st'y frame dwells., n s of Yale St., bet. St. Albans and Grotto Sts.; cost, $2,200; builder, S. T. Bennett.

One-st'y frame dwell., w s of Burr St., bet. York and Case Sts.; cost, $1,800; owner, H. B. Sweet.

Two-st'y frame dwell., w s of Kent St., bet. Carroll and Iglehart Sts.; cost, $3,000; owner, E. C. Varney.

Three-st'y brick block stores, n s of Sixth St., bet. Jackson and Sibley Sts.; cost, $16,000; owner, R. R. Nelson.

Two-st'y brick dwell., n s of Iglehart St., bet. St. Peter and Wabasha Sts.; cost, $5,200; owner, J. F. Williams.

General Notes.

Beaver Falls, Pa.—Dwell., for E. D. Dudwig, Esq.; cost, $4,000.

Catonsville, Md.—Theodore Lurman, Esq., is to have built a basement, two-st'y and attic dwell., brick and frame, 36′ x 30′, to cost $6,000, from designs by J. A. & W. T. Wilson, architects, Baltimore.

Govanstown (Baltimore Co.), Md.—Jas. G. Wilson, Esq., is making alterations, to cost $2,000, from designs &q J. A. and W. T. Wilson, architects, Baltimore.

Greenville, Pa.—Three-st'y store and dwell.; cost, $12,000; Caldwell & Clift.

Reform Church, two-st'y; cost, $13,000.

W. H. Findley, Esq.; Dwell.; cost, $4,000.

D. C. Meyer, Esq., brick dwell.; cost, $3,200.

Illchester (Howard Co.), Md.—Robert Mitchell, Esq., is to have built a two-st'y and attic frame house, 42′ x 60′, to cost $12,000; and a frame tenement-house and stable, to cost $2,500, from designs by Messrs. J. A. & W. T. Wilson, architects, Baltimore.

Middletown, O.—Mr. P. J. Sorg is to build a first-class residence; cost, $40,000; Mr. S. Hannaford, of Cincinnati, architect.

Mt. Washington (Baltimore Co.), Md.—David Baldwin, Esq., is to have built a two-st'y and attic frame dwell., 35′ x 40′, to cost $5,000, from designs by B. B. Owens, architect, Baltimore; R. Vinton Blake, builder, Mt. Washington.

Newcastle, Pa.—Y. M. C. A., three-st'y pressed-brick and stone library-building for Ira D. Sankey, Esq., Brooklyn, N. Y.; cost, $24,000.

Dwell. for E. J. Agnew, Esq.; cost, $7,000.

Two dwells., for A. W. Thompson, Esq.; cost, $6,800.

Dwell. for C. H. Dunlap, Esq.; cost, $3,800.

Dwell. for Mrs. M. I. Foulk; cost, $2,000.

Dwell. for M. H. Allexander; cost, $1,700.

Dwell. for D. I. Compble, Esq.; cost, $3,000.

Dwell. for Mrs. E. Dunlap; cost, $3,200.

Skating-rink for E. M. Richardson, Esq.; cost, $4,450.

Skating-rink for R. M. Allen, Esq.; cost, $5,200.

New Wilmington, Pa.—Brick church, one-st'y; cost, $10,000.

Pontiac, Ill.—There is to be a church built in Pontiac, to cost $13,000 or thereabouts, by the Methodist people.

Relay House (Howard Co.), Md.—Edward Murray, Esq., is to build a two-st'y and attic stone dwell., to cost $12,000, from designs by J. A. & W. T. Wilson, architects, Baltimore.

Rochester, N. Y.—Mortimer F. Reynolds, of Rochester, has given $25,000 to the University of Rochester, for a chemical laboratory, as a memorial of his brother, William A. Reynolds, who was a member of the Board of Trustees.

The Genesee Brewery, lately destroyed by fire, has been rebuilt; Oscar Knebel, architect.

Work on a four-st'y building, cor. East Ave. and Union St., has just been commenced; building to cost $20,000; Jno. Straughen, contractor; Hiram Davis, owner.

The property cor. Central Ave. and North St. Paul St. has just been purchased by Henry Bartholomay, President of the Bartholomay Brewing Co., who intend erecting a large fire-proof hotel.

The Company have also purchased land on Marietta St., on which to erect their bottling works.

Sharon, Pa.—Dwell.; cost, $30,000; J. H. Elliott, Esq.

Bids and Contracts.

Kansas City, Mo.—The Secretary of the Treasury has awarded the contract for gas-fixtures in the public buildings at Kansas City and Memphis to R. Hollings & Co., of Boston.

Hudson, N. Y.—The Board of Managers of the proposed House of Refuge for Women, to be erected at Hudson have awarded the contract for constructing the building to John Moore, of Syracuse, for $86,065. The building is to be fire-proof, and will be 49′ x 110′, covering a ground space of 5,300 square feet.

Rochester, N. Y.—Contracts for the Kirby Building, on East Main St., have been let to McCormick & Hotchkin, for $28,000; building to be completed by November 1, 1885.

Also, contracts for a building for E. F. Woodbury, cor. North St. Paul and Mortimer Sts., 65′ x 155′ of brick and stone, let to Gorsline & Boyd, contractors; Warner & Brockett, architects; building to cost $50,000; to be completed October 1, 1885.

Contracts will be let very soon for a business building on Main St., opposite the Arcade, for Jno. H. Hill, Esq., to be built of stone and copper; Warner & Brockett, architects.

PROPOSALS.

Hospital. **[At Middletown, Conn.]**

Sealed proposals will be received by the Trustees of the Connecticut Hospital for the Insane, at Middletown, **until Monday, June 1st, at 10 o'clock** A.M., for contracting to do the mason and carpenter work for a new hospital building, according to plans and specifications which may be seen upon application to Dr. A. M. SHEW, at the Hospital.

The right to reject any and all proposals reserved.

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Hospital Wards. **[At Athens, O.]**

Athens, O., April 24, 1885.

Sealed proposals will be received by the Board of Trustees of Athens Asylum for the Insane, at their office, at said asylum, **up to 12 o'clock, noon, Tuesday, May 26, 1885,** for furnishing the necessary materials and for constructing two buildings on the grounds of said asylum, to be used as dining-halls and infirmary wards, according to the plans and specifications on file, and to be seen at the office of the Secretary of the Board at said Asylum.

Bids will be received for the whole work or for furnishing any part of the materials, or doing any part of the work, separately, according to the inclination of the Secretary.

All bids must be accompanied by good and approved bond that if the contract is made with the bidder, the work done or material furnished shall be satisfactory in quality to the Board or their authorized agents, and completed within the time designated in the contracts.

The Trustees reserve the right to reject any or all bids.

By order of the Board of Trustees.

A. B. RICHARDSON,
Secretary.

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